THE STORY OF HUMAN PROGRESS

TEXTBOOKS IN THE SOCIAL STUDIES

Junior High School Series

EDITED BY LEON C. MARSHALL

THE STORY OF HUMAN PROGRESS
By LEON C. MARSHALL

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THE STORY OF HUMAN PROGRESS

An Introduction to Social Studies

BY

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New York
THE MACMILLAN COMPANY
1926

Set up and electrotyped. Preliminary edition published October, 1923. Complete edition published February, 1925. Reprinted June, 1925; July, 1926.

PRINTED IN THE UNITED STATES OF AMERICA BY
THE BERWICK & SMITH CO.

PREFACE

The Story of Human Progress is a preview of social studies.

The purpose of this preview is simple—and at the same time ambitious. It seeks to give the pupil a coherent view of the main forces or factors involved in living together in society. It seeks to give him a simple, consistent framework to which he may attach his later thinking and experience, to the end that he may come to think of life as a whole rather than as a series of scattered fragments and to the further end that he may become qualified "to take an intelligent and effective part in an evolving society."

It is of the utmost importance that the pupil of junior high school age be given such a framework. In general terms, his earlier educational experience has been designed primarily to give him sound habits and good tools with which to work. Now a new range of activities opens up. In his later educational experience, and for the rest of his life, he will give much time and attention to matters connected with living in an evolving society. If at the outset of these new activities he is given a simple outline of them, he can be saved much of the bewilderment that is so characteristic of those who have never seen society as a whole and consequently have never understood their own part in it.

Such a project, ambitious as it is, is quite within the abilities of the pupil of junior high school age. In ability to read, in power of sustained attention, and in ability to grasp generalizations, he is ready for the task. All that is necessary is to present the main aspects of human culture simply, so that they are readily grasped; and at the same time to present them with scientific perspective, so that later studies may be built upon a sound foundation.

I. The framework of this present preview is simple. In effect it takes the position that, for the pupil of junior high school age, it is sufficient to talk of four main aspects of living together. They are summed up in these expressions:

1. *Man the harnesser of nature.* This is a discussion of man's increasing control of his environment. The discussion culminates in a survey of the services rendered by scientific knowledge.
2. *Man the communicator.* This is a discussion of how man multiplies his powers by communication, and a survey of the work of the great communicating agencies and institutions of society, such as trade, transportation, language, the press, the school, the church, and the family.
3. *Man the social organizer.* This is a discussion of how man multiplies his powers by coöperation with others, and a survey of the work of our social institutions such as law, government, the market, competition, and private property.
4. *Man the idealist and aspirer.* This is a discussion of the vital importance of ideals and aspirations, and a survey of our developing ideals.

II. This simple framework is simply presented from a pedagogical point of view.

Since our own society is tremendously complex and difficult to explain, the pupil is first shown (very briefly) in Part I that our own ways of living together are really quite new and that man has had a long, hard climb in the process of attaining them. Then he is given a fairly complete picture of living together in earlier and simpler societies. This gives him something with which to compare (and thus better to understand and evaluate) our own living. Quite as

important, it makes him familiar with the concepts, "harnesser," "communicator," "social organizer," and "aspirer," for the discussion of these earlier societies is organized around these four basic concepts.

With the way thus prepared, Parts II, III, IV, and V take up, in turn, the four basic concepts. The treatment is concrete, not abstract, being built up by means of series of type cases. The concepts and the type cases are not discussed for their own sake or as ends in themselves. Always their meaning and significance in social living are emphasized. Always the type cases and the illustrations are drawn from the realm of the pupil's own understanding and experiences. Always they are pointed toward making an organic whole of his experiences and knowledge. Always the discussion culminates in a consideration of the factors involved in living together well.

The text is paralleled by *Readings in the Story of Human Progress*, which extends the discussion of concrete material and type cases beyond the limits possible in a text.

III. The simple framework is presented with scientific perspective so that later thinking and experience may be attached to it.

The pupil's later work in the physical and biological sciences and in their application to the arts of life will tie into the discussion of man the harnesser of nature. His later work in languages, trade, and transportation will tie into the discussion of man the communicator. His later work in the social sciences and his participation in organized society will tie into the discussion of man the social organizer. His later work and thinking in ethics, art, research, and religion will tie into the discussion of man the idealist and aspirer. This is what should be expected. Since these are four fundamental aspects of living together, they

should be expected to reach out into all branches of our organized knowledge and into all parts of our living.

This preview is submitted to the educational world only after careful study and testing. I refer not so much to a fairly long apprenticeship in the social sciences and to fairly intensive work in attempting to see them as an organic whole, as to the actual preparation of this preview. That process has run through many years. Participation with Mr. Charles H. Judd in the preparation of the *Lessons in Community and National Life*, issued in 1917–18 by the United States Bureau of Education and the Food Administration, marked the first publication of material for school use. Since that date the plan of the preview has been worked over repeatedly with social scientists and educational experts. The material itself has been mimeographed, printed, criticised by teachers, and tested in class use.

Teachers will find that the accompanying *Readings* will supply much illustrative material. Then, too, the publishers have provided a pamphlet called *Notes to Teachers to Accompany the Story of Human Progress*. And an arrangement has been made with the Home Study Department of the University of Chicago for a course called "The Story of Human Progress," open to teachers of the material.

Kindly criticism and suggestions concerning the plan and scope of the work have been so numerous that it would seem pretentious to put the list in print. But I must mention the generosity of Professors Harry E. Barnes, Charles H. Cooley, Edgar Dawson, Charles A. Ellwood, Max Farrand, William S. Gray, Alexander Inglis, Charles H. Judd, Harry Pratt Judson, Isador Loeb, Thomas J. McCormack, Henry C. Morrison, Clyde O. Ruggles, Samuel C. Parker, Arthur M. Schlesinger, Arthur P. Scott, and Albion W. Small.

Then, too, experts in various fields have saved me from many sins of omission and commission. Among others, there were Charles H. Beeson, James C. Boykin, Sophonisba P. Breckinridge, Jay F. Christ, Walter E. Clark, Elliot R. Downing, Henry G. Gale, Rollo L. Lyman, Leverett S. Lyon, Mary F. McAuley, John M. Manly, Charles E. Merriam, Henry W. Prescott, Hermann I. Schlesinger, Frank H. Vizetelly, Clark Wissler, and Chester W. Wright.

Many ideas, sentences, and paragraphs have been contributed by the following collaborators and teachers who have studied and tested the material: Ann E. Brewington, Delia C. Briggs, Jeanette Wade Cox, Leona Bachrach Graham, Mary Quayle Innis, Hazel Kyrk, Olga Law, Lyla I. Rowe, Fred L. Schwass, Edith E. Shepherd, Katharine M. Stilwell, and Mildred Janovsky Wiese. May Hardman Gilruth furnished many of the illustrations.

My indebtedness to others is very great. I can, indeed, lay claim to little or no originality except in plan and arrangement. A painstaking effort has been made to give acknowledgment of all printed sources of material. If I have failed to do so in any case, it is because the long period of preparation and the many forms into which the material has from time to time been cast have caused original references to be misplaced.

It is appropriate that I should make particular mention of the generous assistance of the Commonwealth Fund.

LEON C. MARSHALL

Chicago, September 1, 1924

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THE STORY OF HUMAN PROGRESS

PART I

INTRODUCTION: MAN IN EARLY GROUPS OR SOCIETIES

PURPOSES OF PART I

1. To show how earlier groups or societies lived, so that we may better understand how much progress we have made.
2. To show that ability to harness nature increases man's power to live well.
3. To show that ability to communicate increases man's power to live well.
4. To show that ability to do teamwork increases man's power to live well.
5. To show that ideals and aspirations are important in living together well.

CHAPTER HEADINGS OF PART I

You have reached a very interesting point in your learning and thinking.

Behind you is a period during which the school has given you tools with which to work. You have learned to read, to write, to measure and calculate. Ahead of you is a long period — the rest of your life — during which more and more of your thought and effort will go into other channels. In particular, you will become absorbed, in school and out of school, in the great adventure of living in organized society.

Living together in society is such a complex matter that most persons get very puzzled and confused in thinking of it. This book gives a simple outline of what it is all about. It shows that man has done (and is still doing) four big things:

1. He has multiplied his powers by harnessing nature. We shall learn of that in Part II.
2. He has multiplied his powers by communication. We shall learn of that in Part III.
3. He has multiplied his powers by coöperating with others. We shall learn of that in Part IV.
4. He has directed his powers in certain ways because he has ideals and aspirations. We shall learn of that in Part V.

Part I is still to be accounted for. In Part I, pages 5 to 69, we shall see how two early groups of men lived. We can compare their living with ours, and thus understand ours better.

It will be worth while to read the Table of Contents of the book before starting on Part I.

THE STORY OF HUMAN PROGRESS

CHAPTER I

EARLY MAN'S FEEBLE POWERS: THE MERE BEGINNINGS OF TOOLS AND COMMUNICATION

Questions to Keep in Mind while Reading This Chapter

1. In what ways was the "living" of early man different from ours?
2. Why did he live so much less comfortably than we do to-day?

This book tells of our living together in society. — This is a book about ourselves. A book about ourselves should not try to tell everything about us. If it did, it would be such a huge volume that we could not possibly read it in one school year. Books about ourselves, such as histories, life-stories, and physiologies, therefore, usually discuss only certain kinds of facts about us, and so does the book you are now reading.

This book will talk of ourselves *as persons who are living together in what we call* SOCIETY. By reading it we shall find out what it means to live together in society, and we shall learn some of the things we need to know in order to live in society happily and well. All of us wish to know how to live happily and well in our family, in our village or town, in our state, in our nation, and in this vast world of ours. This is only a longer way of saying that we wish to know how to live happily and well in society.

We are so used to living together with others that at first you may think there is little to talk about. You may feel about it much as you feel about breathing. You breathe

easily and without thought; you always have breathed, so why fuss about it? But if someone should hold your nose and mouth so you could not breathe, or if someone should put poisonous gas into the air you breathe, you would quickly conclude that there are some things to look out for in breathing happily and well. And the same thing is true of living together. We must learn what to look out for so that we may live together happily and well. We want no poisonous living together.

Many present-day ways of living together are quite new. — Then, too, the way we live to-day is really quite new and unusual, odd as that may sound. Most of the things with which we are familiar, such as schools, churches, cities, medicines, steamboats, railroads, books, and telephones, are not very old when compared with man's total stay on this earth.

As just one example of the newness of our present ways of living together, let us make a chart showing how recently man has secured such good means of communication as printing, the railroad, the steamship, or the wireless. It will be worth while to keep this chart along with others that we shall make as we work through the book.

Take, now, a large sheet of note paper and, turning it sidewise, write along what is now the top, this heading:

THE LENGTH OF TIME MAN HAS BEEN A GOOD COMMUNICATOR

Underneath this heading draw a seven-inch line, marked off into inches. Let the total line represent the length of time man has been able to write, calling it 7000 years. Now, it would be a terrible task to write with pen and ink all the books we use to-day. We do not do it that way. We print them. We "run them off" by the thousands from printing

presses. Man has had printing presses for, say, 500 years. Represent that on your seven-inch line. Modern books and modern methods of telling our thoughts to one another are really quite recent, are they not?

And let us look at three other means of communication, the railroad, the steamship, and the wireless. We have had railroads and steamships for, say, one hundred years, and wireless for, say, twenty-five years. Can you show these periods of time on your seven-inch line?

Do you see how true it is that many things which you have "taken for granted," without thinking much about them, are really quite new and unusual when measured against the long, hard climb man has had in reaching his present ways of living?

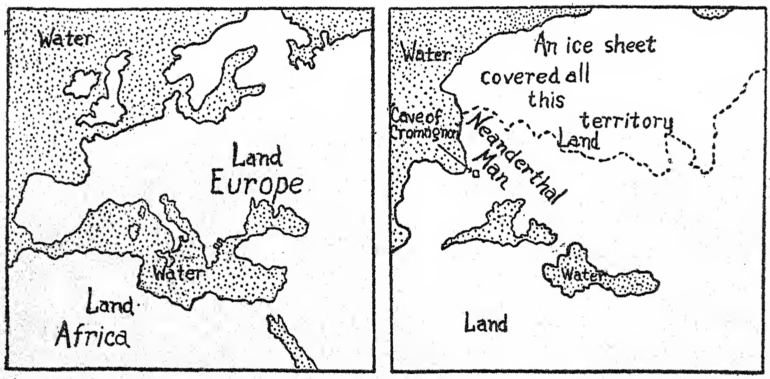
MAN'S LONG HARD CLIMB

We start with a snapshot of early man. — If we wish really to understand our present ways of living together we shall need to know something of the long, hard climb man has had. Knowledge of this climb will show us what progress man has made and how he made it. It will show us how we came to live the way we do. It will help us to get some idea of what our future living together will be like.

Now, we shall not need to study the whole history of

man's climb. It will be enough if we take a snapshot showing in what manner very early man lived and then take another snapshot showing in what manner man lived after he had made thousands of years of progress. It must be remembered that these two snapshots portray ways of living which are thousands of years apart.

Early man's world differed from ours. — When we begin to read about early man, geologists give us a surprise

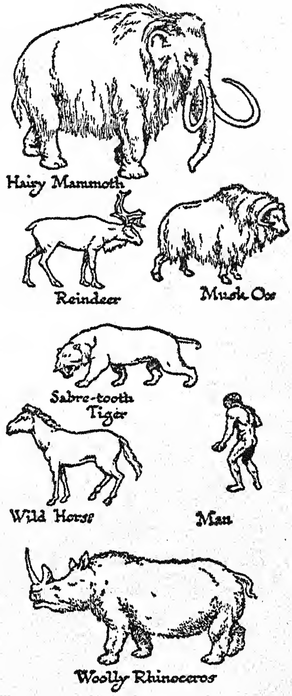


Europe To-day Compared with the Europe of Neanderthal Man

In the Europe of Neanderthal man, England, Iceland, Norway, and Sweden were not separated from the continent. The Mediterranean was then two inland lakes.

by pointing out that early man lived in a world rather different from our own. Probably, up to this time, you have thought that this world has always had the same land and water areas and the same plants and animals that it now has. Nothing of the sort. A continual change has taken place in such matters, and change is still going on. So true is this that people living two hundred thousand years from now may look back at the way we live and think our land areas and our animals as curious as we think those of early man to have been.

Land and water areas. — To see how true it is that the world changes, let us look at the map of Europe as it was at the time when a race of early men called Neanderthal men lived there. This time covered thousands of years. At the time of *early* Neanderthal man, Europe had a temperate climate. Then there began what geologists call the Fourth glacial age. There had been three others. Great glaciers, or masses of ice and snow, pushed down from the north so that the *later* Neanderthal man lived in a Europe whose whole northern section was under a thick covering of snow and ice. Although he lived in the part of Europe that was not thus covered, the climate was, of course, cold and harsh.



Courtesy of Wells: The Outline of History

The sea was much shallower than it is now. England and Ireland were still parts of the mainland. What are now the Irish Sea, the North Sea, and the English Channel were then valleys through which great rivers flowed, before the covering of ice crept down. What is now the Mediterranean Sea was then merely two inland lakes, and a person could have walked, dry shod, from Africa to Europe over what are now the Strait of Gibraltar and the sea to the south of Italy. All this is a different Europe from the one we know.

Animal life. — As for animals, there were in the earlier temperate period animals suited to a temperate climate,

some of which are no longer on the earth. There were the huge mammoth, the straight-tusked elephant, the hippopotamus, the broad-nosed rhinoceros, bison, aurochs, red deer, giant deer, badgers, beavers, and a few sabre-toothed tigers. But as the glaciers crept down and the climate became harsh and cold, some of these disappeared and there came in gradually such lovers of cooler weather as the reindeer, the hairy mammoth, the woolly rhinoceros, the musk ox, the cave lion, the cave bear, the cave leopard, the cave hyena, the arctic fox, the arctic ptarmigan, the arctic hare, and the steppe horse. Their very names show the change that was taking place. Some developed "woolly" coats, others took to caves for shelter, others are described by the word "arctic."

Plant life. — Of course, corresponding with these changes in animal life, there came changes in plants. Plants more suited to frigid temperatures took the place of those adapted to temperate climes. One must not be too greatly puzzled by these changes. It took thousands of years for Mother Nature to work them out.

An account of how early man lived. — What sort of life was Neanderthal man living during these great changes?

Of course, we shall never *know* all the details of how this early man lived. We have not learned about him in the same ways that we have learned about people who live in our own time. There is no person alive to-day who ever saw him. We cannot, therefore, learn of him through an account by an observer, or witness. Furthermore, we cannot read about him in any books that he himself wrote, for, as you shall see, he could not read or write and so could not have left that kind of record for us to study. We cannot learn of him even by means of stories which have come

down by parents' telling them to children, generation after generation.

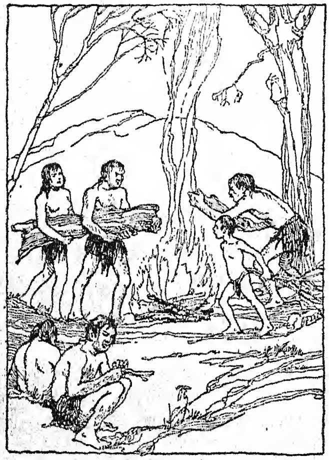
No, we have learned about him in an even more fascinating way. Such things as some of his own bones, bones of animals he lived with, and some of his crude stone tools and weapons have been found lying together in places where, through these long thousands of years, they have been preserved because they were accidentally covered with soil or because they were in some cave. These fragments have been studied very carefully and some of them have been compared with similar things that exist to-day among living savage peoples. The scholars who have done this studying have pieced together an account of the way this early man probably lived. You can easily see that we cannot be absolutely sure that all of the details of this account are correct. The proof of the details is not as clear as the proof you could give that you ate oatmeal for breakfast this morning, or that street cars run on iron rails, or that Washington was the first president of the United States. But we may be fairly confident that the broad outlines of the story[1] are sufficiently correct to serve our present purposes.

If we imagine that we could suddenly chance upon a group of these early people we should find many things different from the life of to-day. If the weather is good they are probably out in the open near a fire built at the foot of a cliff. There are no houses; there is no shelter except the overhanging cliff and its caves. Such is the "home" of Neanderthal man.

Their "talking" is done mainly by sounds and signs. At a signal of danger they point and imitate the roar of the lion,

[1] The story as given in the following paragraphs is adapted from Worthington G. Smith, *Man, The Primeval Savage* (Edward Stanford, Ltd.), pp. 48–59. It gives a scientist's picture of what primeval man probably was and how he probably lived.

the growl of the bear, or the bellow of the elk. They also express their thoughts (as indeed we do to-day) by movements of the eyes, eyelids, and mouth; by grimacing; and by gestures. Like all other primitive people they are able to do quite a bit of "talking" by such devices — and this is fortunate, for they have few of what we call "words." The few words that they do have would seem like clicking sounds to us until we grew accustomed to them.


TENDING FIRE

Some of the group, especially the young people and children, are full of life and frolic; others are in ill-health, burnt with fever, or wheezing and coughing with colds. Some are clean, others very dirty.

The young people romp and play, take hands and dance in rings. They engage in sham fights. They climb trees and swing from branch to branch, and paddle about and play in the streams. They play games of throwing stones and sticks.

The primeval men and women work as well as play. They look after fuel to keep up the fires. They gather together fallen branches, twigs, ferns, and other dry vegetable materials. They hack and break off branches. They are not able to tie up bundles. They have no baskets and no pottery. They must walk to the stream to quench their thirst, for they have no vessels, except an occasional one made from part of the skull of some animal.

These early people make stone implements. They look for suitable blocks of flint, push such flints out of the chalk, stiff clay, or earth with sticks and bring them to the home of the group. There, by the fireside, the more skilled and light-handed ones make crude, pointed stone weapons and edged choppers and knives. These weapons and tools have rough jagged edges. Thousands of years must go by before man learns to make stone tools having smooth polished edges.

This primeval savage has for food hazelnuts, beechnuts, chestnuts, and acorns. He has crab apples, wild pears, wild cherries, wild gooseberries, blackberries, dewberries, hops and haws, watercress, fungi, the larger and softer leaf-buds, as well as other delicacies of the vegetable kingdom. He has birds' eggs, young birds, snails, frogs, and the honey of wild bees. By the seaside he has fish, mollusca, and seaweed. He has some of the larger birds and small mammals, which he gets by throwing stones and sticks. He has the snake, the slowworm, the crawfish, grubs, insects, the large larvæ of beetles, and various caterpillars.

In addition to the smaller animal life he sometimes finds the remains of oxen, horses, and deer naturally dead or newly killed and only partially consumed by the lions, bears, hyenas, and wolves. The heads are hacked and torn off, the skulls split open with ponderous stone axes, and the soft and tasty brains eaten on the spot. The old people, being toothless or nearly so, are glad of a meal of this kind; they are not able to chew tough meat. The old men and women pull out the larger bones, smash off the knobby ends, push out the marrow with a stick, and eat it as one would now swallow an oyster.

Primeval man is commonly described as a hunter of the great hairy mammoth, the bear, and the lion, but it is very improbable that he ever hunted animals much larger than

the hare, the rabbit, and the rat. Man was probably the hunted rather than the hunter. Away from the fire he would see, hear, and dread the larger animals. As a rule, these animals, unless driven by hunger, would not seriously molest him. In times of danger man would flee to the trees. It would be useless to run to the water, as most of the animals could swim.

Early Man Had no Weapons Equal to such an Occasion

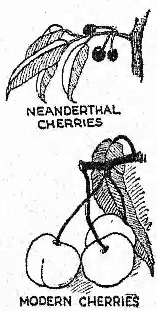
This account shows how far man has climbed. — Let us think back over this account of early man and get from it, and from other evidence, certain general ideas concerning his life. These generalizations will help us to make some comparisons with the way in which we live to-day.

1. *Food, clothing, and shelter.* — Let us begin by noticing how ineffective he was in getting his shelter, food, and clothing. As far as we can judge, in the pre-glacial period he had little more shelter than most wild animals have in their forest lairs. Quite likely he knew enough to break off branches and make rude dens in caves or by the sides of cliffs, but there is no reason to suppose that he could build a shelter nearly as good as the house the beaver makes. And without the protection of good shelter how he must have trembled at the threatening sounds of the huge animal life surging and crashing about him! Even when the glaciers, creeping down from the north, brought on a semi-

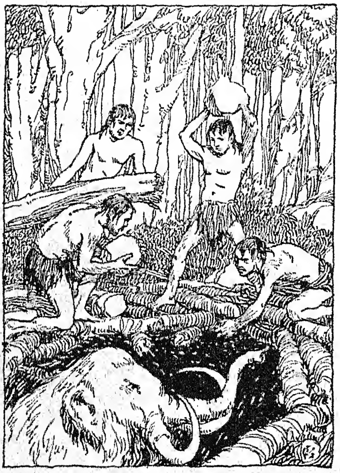
arctic climate, cold and damp, he could not build houses. He sought shelter under overhanging cliffs and chatteringly disputed with animals the possession of such natural shelter as caves afforded.

His plight with respect to food was no better. He grew no fruits or vegetables. He did not raise crops of any kind. Such a thing did not occur to man for thousands of years after this time. He ate such plant products as he found growing wild, and these were wretched specimens when compared with our cultivated fruits and vegetables of to-day. He had no domestic animals — not even the dog — so that he raised no food by having herds.

He was a hunter but he was an ineffective one, for his weapons were puny and feeble against all fair-sized game and against all swift game. Very likely he had clubs and sharp sticks. He certainly had hand hatchets of flint, but it is not likely that he had learned to make spears and axes by attaching his flints to handles. Bows and arrows he had not. It is not even likely that he had the fishhook; almost certainly he had no nets. It is possible that he knew how to dig trenches — at what cost of painful handscratching of dirt! — to snare mammoths, and if this is really true, one can imagine these yelling forerunners of ours standing on the edge of the ditch and working for hours even to kill the giant they had trapped.



In the main, you see, early man had to depend for his food upon very uncertain means. He was almost certainly hungry for more of the time than he was well fed. And such food as it was! If it was cooked at all, it must have been roasted in the ashes, for he had no pots or other cooking vessels. And its eating was certainly not attended by any use of such tools as knives and forks, and not blessed with anything that we should recognize as table manners.


DID THIS REALLY HAPPEN ?

As for clothing, anything better than rough, unsewn skins of animals, poorly cured by being dried in the sun, never occurred to him. Any such thing as cloth came thousands of years later. Even skins could not have been very plentiful in view of the wretched character of the hunting tools.

You would not wish to have such meager and uncertain food, clothing, and shelter.

2. *Communication.* — His mental tools, as represented by words and speech, were as poor as his physical tools, as represented by stone hand-hatchets and clubs. Have you ever realized how important words are to you in trying to think? They are the tools of thought. You are proving this fact when thoughts rise to your mind as you read the words of this book. Early man had few words, and his lack of them limited his power to think, just as his lack of bows, arrows, and guns limited his power to kill game. Such thoughts as he had were passed on to others by gestures, grimaces,

and by some few words. Of course such people could not make many plans together. This poor ability to plan lessened their teamwork and handicapped them in getting food, clothing, and shelter, and indeed, in all their living together.

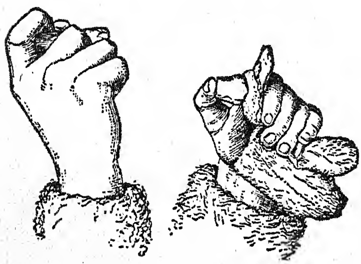
Just compare their ability to communicate with one another, to plan together, to talk things over, to teach one another, with what we have to-day. We have not only speech, but writing. We have books, newspapers, telephones, schools, churches, movies, and a host of other "thought quickeners" and "plan transmitters." We can really "work together" fairly effectively.

You would not wish to be without our modern speech and means of communication.

3. *Health.* — In such matters as health, recreation, government, and religion, early man was as pinched as he was in getting the necessities of life, food, clothing, and shelter. We should have to guess so much about his recreation and religion and government, that we shall not study such matters until we take a snapshot (in Chapter II) of a much more advanced savage life that has actually been seen by modern writers. But we know what must have been the state of affairs as regards the health of early man. It must have been wretched. No doctors, no hospitals, no knowledge of what caused sickness or what to do about it — and this in the midst of a situation full of dangers to life and limb and full of causes of sickness. Cold, damp, arctic cave life, with poor food and clothing, does not make healthful surroundings, and it must have been anything but a safe task to hunt the animals of that time with the weapons at man's disposal.

You would not wish to have your health so poorly safeguarded as was that of early man.

4. *The beginnings of the harnessing of nature.* — And now we come to the most important generalization of all. He lived as safely and well as he did largely because he had at least begun to use tools — to harness nature and to make it do his bidding. We shall find, as we go on in this book, that man's climb can be told — it is only one way of telling it — as a story of man's increasing power to harness Dame Nature, and we are now seeing the beginning of this harnessing.



Courtesy of the Smithsonian Institution

STRIKING FIRE

In the hand at the right there is one piece of pyrite just under the thumb. Under this pyrite is held some dry tinder upon which the sparks are to fall.

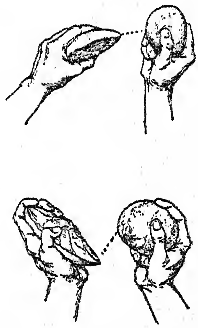
He did have fire, and that fact saved him when the glaciers came. How man originally got fire we cannot be sure. Perhaps he got it from volcanoes. Perhaps he got it from some burning forest tree that had been kindled by lightning. Perhaps he got it from nature in some other way. Whether Neanderthal man knew how to "make fire" is uncertain, but some writers believe that he was able to do so by striking iron pyrites — a kind of iron ore — together and letting the resulting sparks fall in a handful of dry grass. So much we know: the dead embers of his fires have been found in his caves along with his crude tools and with the bones of the animals he ate. And fire meant life for him and a chance for the race to improve. It was a first step in harnessing nature.

He did have clubs and sticks and crude stone tools, even if he did not join them together and make arrows and axes with handles. What he had was at least a beginning, and in a very real sense his tools are the forefathers of the wonderful tools and machines which to-day help us so much.

His stone tools were made of flints, which will often break in such a way as to leave a sharp cutting edge. Very likely man's first stone "tools" were just conveniently shaped stones that he *found* and that he did not *make* at all. But Neanderthal man had reached the point of *making* these stone tools, and that was no slight advance, as you will soon come to believe if you try to make some of them yourself. They are by no means easy to make. They require a great deal of time, work and skill.

The stone tools of early man may seem very crude and ineffective to us, but we must remember that these tools did enable him to kill some animals, to crush bones for the marrow, to skin animals and to scrape the skins, to hack clubs and sticks into shape, and to do more than could be done with the bare hand. This was progress — great progress.

But you would not wish to depend upon such crude tools.



Courtesy of the Smithsonian Institution

MAKING HAND TOOLS

The upper picture shows the first step in making a thin blade. The lower picture shows the beginning of the shaping of the other side.

PROBLEMS

1. Early man had no pottery, baskets, or similar utensils. Make a list of the things you have in your home that he could not possibly have had, in view of the absence of these things. Tell some things that you and your family can do that he could not possibly have done.

2. He had no metals. Look around your schoolroom and see what would be left if we had no metals to-day. Name some things outside the schoolroom which we should not have if there were no metals. In what ways would the absence of metals make a great difference in our getting food, clothing, and shelter?

3. He knew nothing of germs as possible causes of disease. What things do we do differently from the way he did them, because of our knowledge of such matters.

4. The fire-places or rude home-places of primitive man were probably always near water. Why was this necessary? How do you get a drink when you want one? How do you account for the difference between the way you do it and the way Neanderthal man did it? Is it a story of harnessing nature?

5. What uses did Neanderthal man make of fire? What uses do we make of it to-day?

6. "We should not wish to be dependent for our progress to-day upon the crude tools of early man." What have we that is better?

7. "We should not wish to have our health so poorly safeguarded as was that of early man." What have we that is better?

8. One writer has said, "The kind of living early man had depended mainly upon the whims of Nature. The kind of living man has to-day depends much more upon himself." Is this true? If it is true, what explains the difference?

9. Answer the questions at the beginning of this chapter.

Interesting Reading

Marshall: *Readings in the Story of Human Progress,* Chapter I.

1. The Earth in Space and Time (a glimpse of the wonders of the universe and the part played by our earth).
2. The Newness of Civilization (the short period of time man has lived in his present ways).
3. Unlocking the Secrets of the Past (how we have learned about early man).
4. The Art of Cromagnon Man (a glimpse of early cave drawings).

Problems to think over are given in these reading selections.

CHAPTER II

THE GREATER POWERS OF A LATER MAN: THE BENEFITS OF TOOLS, COMMUNICATION, AND SOCIAL ORGANIZATION

A. Introduction: the Iroquois an Example of this Later Man.

B. The Iroquois as Tool Makers and Harnessers of Nature.

C. The Iroquois as Communicators.

D. The Iroquois as Teamworkers and Planning Organizers.

Questions to Keep in Mind while Reading This Chapter

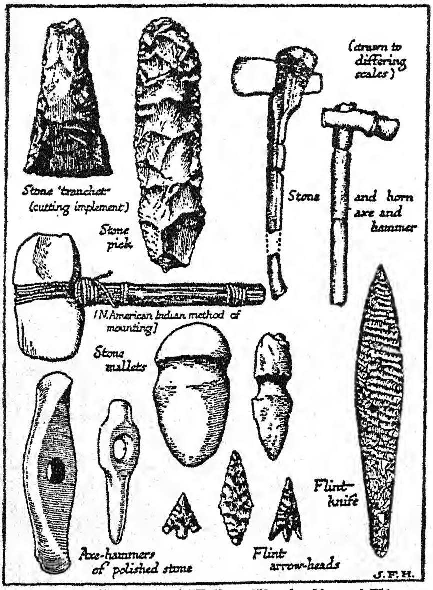
1. Just what did the Iroquois do by way of harnessing nature and how much did it help them?
2. Just how did the fact that they were communicators help the Iroquois?
3. What were the main social groups of the Iroquois?
4. What is social control, and what forms of it did the Iroquois have?

A. Introduction: the Iroquois an Example of this Later Man

The account of Neanderthal man was a snapshot of an early man who lived but little better than do the animals. He had but the beginnings of speech. He had made but the merest start in harnessing nature and in making her supply his wants. He lived meagerly and wretchedly.

For thousands of years this kind of man dragged on his miserable existence in Europe and then he seems to have been wiped out completely. Our best guess is that he was wiped out by a more able type of man who, in some other

part of the world, had slowly developed better tools and greater powers. This more able man seems to have drifted into Europe from the south. He followed, in his hunting, the animals who moved northward as the great glaciers melted and drew back toward the pole.



Courtesy of Wells: The Outline of History

NEOLITHIC IMPLEMENTS

Neolithic means "new stone." The people who made such implements ground them or polished them so that their edges were better than the edges of the implements made by Neanderthal man or by reindeer man, who are sometimes called "old stone" men. "New stone" man is just a way of saying "more advanced" man.

These newcomers have come to be called "Cromagnon Men" or "Reindeer Men." They had much better tools and weapons than did Neanderthal man. They quite surely had much more in the way of speech than had Neanderthal man.

After still other thousands of years, these reindeer men also disappeared as a result of the slow coming in of still another branch of the human race, called the Mediterranean branch. This later branch found a Europe much like the Europe of to-day. Its land and water areas were about the same. So also were its plants and animals.

This people had climbed still a few steps higher than had the reindeer men. Their stone axes and other tools were ground or polished; those of the reindeer men had been made of roughly chipped stone without any polishing. They had,

too, many more tools, weapons, and implements than had their predecessors. In particular, there is no question that they made much use of the bow and arrow. Then, too, they had made at least the beginning of taming animals and of keeping herds for use as food. They knew how to make pottery and various kinds of cooking utensils. They could weave coarse fibres and rushes. They had made a beginning in planting seeds and in raising food supplies. In brief, they were much abler harnessers of nature than reindeer man.

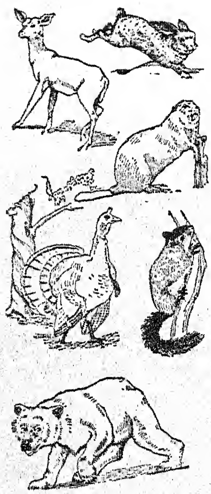
The Iroquois discussed as an illustration of neolithic culture. — It so happens that this neolithic way of living, this neolithic culture, was the stage which some of our own American Indians had reached when the whites from Europe found them. Because of this we shall take our snapshot of neolithic culture not from the neolithic peoples who lived in Europe thousands of years ago but from our own Iroquois Indians as they lived a little more than two hundred years ago.

It would be hard to find a more interesting subject for one of our snapshots than the Iroquois. One tradition says that their early home was in the far Northwest, around Puget Sound, and that they were there a fish-eating and hunting people. Tradition further says that some time in the dim past they migrated to the Mississippi Valley and there, through centuries of slow progress, they found out how to harness nature by raising foodstuffs — that is to say, they learned agriculture. From the Mississippi Valley they drifted northeast and finally came to the region where the white men found them. This was in the general location of our present state of New York. Here the five tribes, the Senecas, the Oneidas, the Cayugas, the Onondagas, and the Mohawks, had formed a great confederacy known as the "League of the Iroquois."

B. The Iroquois as Tool-makers and Harnessers of Nature

(In shelter making, hunting, fishing, agriculture, and domestic arts.)

The Iroquois lived in a good physical environment. — The region in which they lived, as you know from your study of geography, was well fitted to serve the three main pursuits of the Iroquois, fishing, hunting, and agriculture. The region abounded with lakes and streams, which fairly teemed with fish. Then, too, it was a hilly region whose forests of maple, pine, ash, spruce, elm, oak, and other noble trees sheltered moose, deer, beaver, bears, rabbits, squirrels, pigeons, ducks, geese, turkeys, and dozens of other representatives of wild animal and bird life.

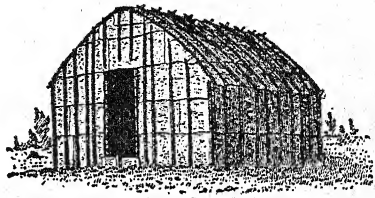


The wild plant life was equally abundant and provided, in the way of food, such things as acorns, hickory nuts, chestnuts, walnuts, cranberries, strawberries, raspberries, grapes, paw-paws, whortleberries, May apples, crab apples, and many edible roots. The forest yielded, too, the raw materials of such crude "manufacturing" as the Iroquois engaged in. The various trees gave the materials for canoes, snowshoes, bark barrels, bark baskets, lacrosse sticks, and many other implements. The inner fibres of the elm and moose wood, together with the wild hemp, gave material for coarse cord with which to supplement vines, animal tendons, and strips of skin as binders and lashings. Reeds from which mats could be made were abundant, and the skins of animals could be fashioned into clothing. The fertile valleys and hillsides gave good locations for raising the corn,

beans, squashes, and melons that were their main agricultural products.

As one thinks back over the many ways in which nature helped these people, one begins to understand what is meant by saying that the physical environment is very important in determining whether men can live together well.

The Iroquois harnessed nature in providing shelter. — When we read about Neanderthal man, we saw that it was also important, if man was to live well, that he should have tools, that he should be a harnesser of nature. Let us look at the various implements or tools which the Iroquois had and, first of all, let us look at their shelter.



Courtesy of the New York State Museum

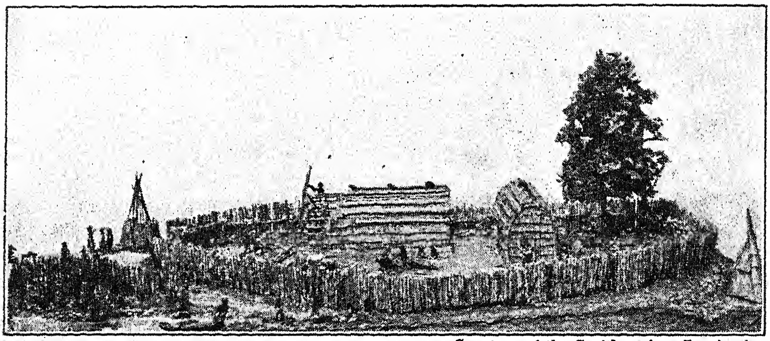
IROQUOIS BARK HOUSE

This shows the method of construction of the Iroquois bark house. Most of the houses were much longer. Several "families" lived in one "long house."

The long house. — The Iroquois called themselves *Ho-de-no-sau-nee* or "People of the long house," and the name was well chosen. When the Iroquois built a house, they set upright in the ground two long rows of hickory saplings, set opposite each other in pairs, so they could be bent over and made into a long series of arches. The builders then lashed split poles lengthwise on these uprights, much as we to-day put laths on the uprights of a frame house. Then they lashed great slabs of bark on this framework of the wall and roof, leaving an open space about a foot wide at the crown of the roof so that the smoke of their fires could get out. Outside this covering of bark were lashed still other upright poles so that the whole was really quite strong and rigid. They used lashings because they had no metals and therefore no iron nails.

Such partitions as they wished to make inside the houses

were built of the same material, or were made of animal skins. These partitions did not reach clear across the long house. An open passageway about six feet wide ran its whole length, and in this passageway the fires were kept. For each fire there were two (sometimes four) families, the fire being between them. This gave each family an alcove that was six or more feet deep and nine or more feet long.



Courtesy of the Smithsonian Institution

IROQUOIS VILLAGE

It does not look much like one of our villages. There were no schools, churches, waterworks, paved streets, electric lights, street cars, stores,—just a few dwellings.

In some long houses a seat or couch, made of poles and perhaps two feet high, ran along the wall. This served for what we would call chairs and beds. Higher up on the walls there might be another wide shelf, serving as a place to put utensils and households goods. At the very ends of the long house there might be vestibules, which could be used either as storage places, or as places for the young men to sleep, or for both purposes. There were no windows, and there were only two doors, one at each end of the long house. Some doors seem to have been made of bark and to have had a crude sort of wooden hinge. Others were just curtains of skins. Over the door was a crude representation of an animal or bird

from which the particular group living in that long house took its name. There were eight such groups (the scientific name is *gens*, with the plural *gentes*) in the Iroquois tribes. They were represented by the wolf, the bear, the beaver, the turtle, the deer, the snipe, the heron, and the hawk.

A village. — The long houses occasionally stood alone, but much more frequently several of them were grouped together to form a village. The whole village was sometimes protected by a sort of stockade or palisade made of logs. Such a village stronghold was likely to be located on a side of a steep hill near a stream of water. The hill and the stream gave the families some protection against a sudden raid by an enemy and at the same time gave them the needed ready access to water. Once a village was made, it was likely to remain in the same place as many as ten or fifteen years, since it was usually not worth while to move unless the surrounding soil had become poor, or the game and fish scarce.


BRAID OF CORN

This description of Iroquois shelter may sound like an account of one of our pleasant vacation shelters. In the summer some of us get a good deal of enjoyment by going away from our noisy, complex city life and living simply, with few tools and few household utensils, in the woods. But when we do this, we live with a great deal more comfort than did the Iroquois. To begin with, they must have been a bit crowded in their homes. Here they kept their bark barrels of dried corn, nuts, and dried berries, and here they hung their strings of dried squashes and their braids of corn ears, the husks being used for the braiding. Here they kept the skins, pottery, bows, arrows, war clubs, clothing, and playthings of the whole group.

Quite aside from the crowding there were other unpleasant features. With all their good qualities the Indians were not a very cleanly lot, and the long house rather quickly became greasy, dirty, and smoke-smirched. In the wintertime, indeed, the smoke was so bad that apparently it was not comfortable to stand erect. Their couches did keep them off the damp ground, but they were not the only users of these couches; fleas and bedbugs were plentiful. This place, filled occasionally with the stench of fish being dried in the smoke of the fires, was not as pleasant a place to live in as your summer cottage. But with all that, neolithic man (as illustrated by the Iroquois) had far better shelter than Neanderthal man.

Appropriative, adaptive, and creative stages illustrated in shelter making.[1]— This is a good place to begin to understand what is meant by certain words or terms that show stages or steps in man's harnessing of nature. The words we shall need to understand are these: the appropriative period, the adaptive period, and the creative period.

The appropriative stage. — Let us now illustrate these terms by using them in connection with man's shelter. As far as his shelter was concerned, Neanderthal man was in the appropriative period. The word "appropriate" means "take." Man merely *took* what nature supplied him in the way of shelter and did nothing to improve it. This means that he sought shelter under bushes and in caves.

The adaptive stage. — When Neanderthal man began to make a few improvements (as very likely he did), he was beginning the adaptive period. You can see that the word means that man takes things furnished by nature and adapts them, or modifies them, or works them over into better shape for his use. When Neanderthal man piled a heap of stones

[1] Cf. Slosson, *Creative Chemistry.* (The Century Company.)

at the mouth of his cave to keep wild animals out, he was adapting, he was modifying nature. He had begun the adaptive period. Our Iroquois friends were distinctly in the adaptive period. They took bark and skins and poles and fashioned them into dwelling-places.

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MODERN CREATIVE SHELTER MAKING

Compare this with the home of Neanderthal man (page 15) and with the home of the Iroquois (page 26).

The creative stage.—We shall not now stop to see all the steps by which men gradually passed into the creative period, in which man is no longer content merely to appropriate, or even to adapt. He *makes* or *creates* new fibres and substances — fibres and substances not found in nature — and from these fashions all sorts of things. In our house-building to-day we are partly adaptive, but we are largely

creative. We adapt with stones and lumber but we have created new substances in bricks, mortar, plaster, glass, and steel. Our modern houses and modern skyscrapers are, as a result, as far superior to the long houses of the Iroquois as these long houses were superior to the damp, dirty, smelly caves of Neanderthal man.

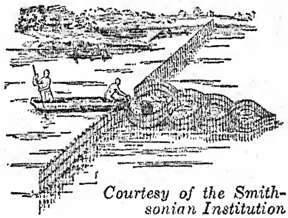
We shall find as we go on with our study that what is true of our shelter is true of everything else. These words, appropriative, adaptive, and creative, will come to mean much to us as we watch man in his long process of harnessing the forces of nature to do his bidding.

The Iroquois harnessed nature when fishing and hunting.— Neanderthal man had poor results from his fishing and hunting because he had almost no tools with which to do this work. The Iroquois had such tools and as a result their food supply was much more abundant and much more regular.

Fishing devices. — As for fish, it is quite probable that Neanderthal man had to be content with clams and dead fish found floating around, — with only an occasional lucky capture of a live fish. The Iroquois knew how to make harpoons with jagged edges, which held the fish that had been speared. These harpoons enabled them to make good catches because fish were quite abundant. They may have had a sort of a fishhook also, but if so, it was not a very good one.

They got their largest catches by what we should to-day call seine fishing and by the building of weirs. They knew how to make cords and ropes from the inner fibre of the elm, from the tendons and long hairs of animals, and from the vines of the forest. With these they made dip nets and seines and thus caught fish by the dozen. Then, too, they used branches and vines to make closely woven weirs or fences for

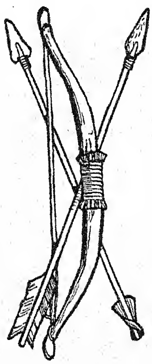
catching fish. One way of doing this was to put such a fence across a river and then, beginning far up or down stream, a line of men with branches would wade the stream in the direction of this fence, frightening the fish before them. When they reached a point near their first fence, they built a second fence across the river and then caught the fish that were between the two fences with spears and seines. Another way was to make in the river a V-shaped fence that ended in a sort of open box at the angle of the V. They would frighten the fish down the V into the box, and people stationed there would spear them or dip them out. Sometimes such weirs were made of stone. All these adaptive means would have sounded wonderful to Neanderthal man.



Courtesy of the Smithsonian Institution

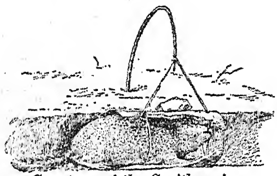
FISH WEIR

The fish are being dipped out with a net.



Hunting devices. — Their hunting was as effective as their fishing. Here also they used the spear, but they used the bow and arrow much more. The Iroquois bow was almost as long as a man. It was made of very stiff wood and was strung with a cord made of animal tendons. They would take the long tendons from the hind leg of a deer, soak them in water, and separate them into many strands, and would then roll the strands into a remarkably strong cord. The arrow shaft was a long straight stick carefully dried and prepared. At one end they bound a flint arrow head, using for the purpose green rawhide or wet tendons. These shrank as they dried and fastened the flint head on very firmly. On the other end of the shaft they bound fronds stripped from

feathers. They bound these fronds on the shaft with a twist. This made the arrow revolve in its flight and as a result it flew straighter. These weapons were really very effective.

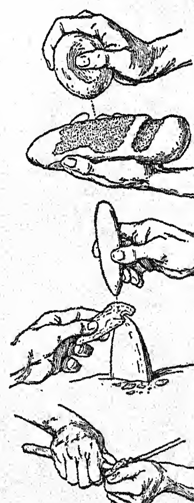


Courtesy of the Smithsonian Institution

MARMOT TRAP

When the marmot gnawed through the thong, the bent sapling sprang up, and the noose tightened around the marmot's body.

Then, too, they knew how to make traps and snares. They would stretch nets from tree to tree in the woods and capture hundreds of pigeons in a single night. They had individual snares of the sort shown in the picture. They made snares for deer by bending over a young tree and fixing a noose on the ground. There was a sort of trigger so adjusted that, when the deer passed, the noose would tighten around his hind legs, the tree would spring back, and the deer would be suspended. They made for killing deer long V fences quite like the scheme they used in fishing.



Courtesy of the Smithsonian Institution

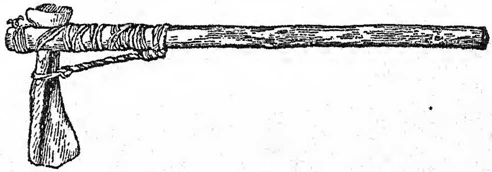
MAKING AXES AND ARROWHEADS

Their tools were helpful. — Of course, they could not have made all these devices if they had not had tools to work with. Their knives of crude stone, bone, or wood (they had no metals), and their axes, which were hafted or supplied with handles — as had not been the case with Neanderthal weapons — stood them in good stead. Probably these stone axes were not used very often for actually cutting wood. They would be rather brittle for such work. Probably these stone tools were used in woodcutting mainly as a means of hacking or scratching out the charred parts after the bulk of the work had been done

by fire. By keeping the charred parts out of the way, they could of course make the fire work much more rapidly.

They were beginning to domesticate animals. — The Iroquois had not made much progress in the way of taming or domesticating animals. They did not have the horse. This animal is not native to America, but was brought in by the white man. They did have the dog in great numbers, and he was probably used in the chase.

The Iroquois harnessed nature when they tilled the soil. — Agriculture is, of course, a harnessing of nature. We make nature do our bidding and give us fruits of the soil. We prepare the soil, drop in the seed, keep the place free from the weeds, supply moisture if necessary, and nature does the rest. The crop is a result of our harnessing nature's powers and making her serve us.



Courtesy of Wilson: Agriculture of Hidatsa Indians, (University of Minnesota Press)

NEOLITHIC AGRICULTURAL TOOLS

The digging stick is just a stick of wood about 37 inches long. The hoe is about the same length. Its blade is the shoulder bone of a deer.

The Iroquois had learned to do this even if they did not do it as well as we do it to-day. They cleared the land of trees, brush, and weeds by the use of fire and their stone axes. After the land had been cleared, they used a wooden digging stick with which they gouged or dug up the soil and prepared it for the seed. This preparation of the soil was a long

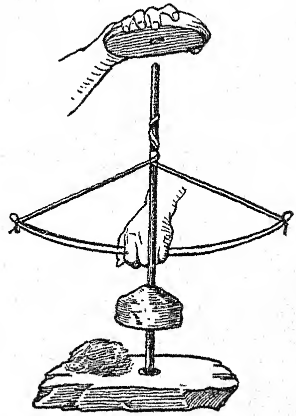
hard job, since they had not invented the plow and had no horses to draw it, even if they had known of it. Once the seed had been planted, they cultivated the land and kept it free from weeds by the use of their bare fingers or by the use of crude hoes made of wood, or of tortoise shells, or of the shoulder blade of a deer fastened to a wooden handle. Crude as these tools were, agriculture is so much more effective than hunting or fishing that it furnished the main part of the food supplies of the Iroquois. They raised corn and beans and melons and squashes, and referred to corn, beans, and squashes as the "three sisters," "our supporters." Supporters they were indeed. Some villages had several hundred acres of corn.

Primitive agriculture, you may say. Yes, but it was as much better than Neanderthal man's appropriative use of wild berries and roots as our modern tractor plowing (see page 87) and tractor harvesting are better than the way in which the Iroquois raised foodstuffs.

They used tools within the household. — Man is just as truly a user of tools, just as truly a harnesser of nature within the household, as he is in his outdoor life.

Neanderthal man took his food and ate it almost as nature furnished it. At the very most he was able to cook his meat a little by putting it in hot ashes or by supporting it on sticks before the fire. He did not know how to boil food. Thousands of years had to go by before man learned that, for he had first to learn how to make cooking utensils in which he could do the boiling. Neanderthal man was mainly appropriative in his household acts. The Iroquois, however, had developed to the adaptive stage. Of course, they appropriated many things, such as nuts and berries, directly from nature, but they adapted most of their food and clothing. They were able to do this because they had tools for that purpose.

The fire-making tool. — To begin with, the Iroquois had advanced far beyond Neanderthal man in ability to make a fire, which is perhaps the most important single device (fire may quite properly be called a device) that man has ever used. They knew how to use the bow drill, and since that drill is so fully explained in the accompanying picture, we need merely to remind ourselves what a wonderful thing it was that the Iroquois, no matter where they might be, could find a piece of dry wood and build a fire. It meant much, not only in the way of shelter but also in the way of proper food.



IROQUOIS PUMP DRILL

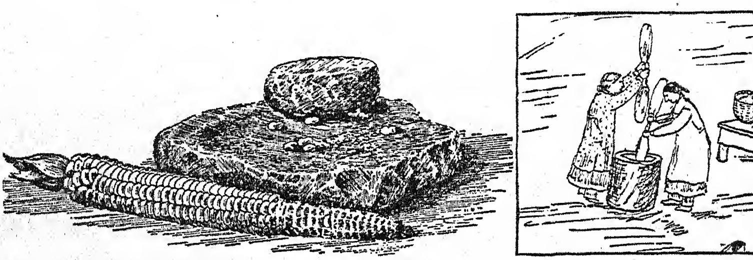
The string would be twisted around the spindle and the bow pressed down. The spindle would then spin and wind up the string in the opposite direction. The bow would again be pressed down and the spindle would whirl back. This was kept up and the friction of the whirling spindle upon the dry board below presently caused flame to burst forth.

Devices for preparing and storing food. — For preparing their food they had both stone and wood mortars in which to crush their corn and they even knew how to take the harsh hulls from the corn by boiling the kernels and then bruising the hulls off. After they had crushed the corn in mortars, they sifted this meal in sieves made of wood fibres or of animal tendons and got it into still better shape for cooking. They had earthenware cooking utensils made of clay (or clay mixed with ground shells or flint) and then baked in a fire. With these they could bake, roast, or boil any of their foods.

The Iroquois had taken another step which sounds very simple to us to-day but which was far, far ahead of the ways of Neanderthal man. The Iroquois had learned a few "first lessons" in preserving and storing food supplies. This meant

that when food was plentiful, they could prepare it, put it aside, and keep it until a time when food was less plentiful. They were thus saved many of the hunger pangs which had been such common experiences of Neanderthal man. He had never thought of laying up supplies for a time of need; so he gorged or stuffed himself when food was plentiful and went hungry, or even starved, when it was scarce.

In the berry season the Iroquois dried strawberries, mulberries, huckleberries, and raspberries. In the green-corn



Courtesy of the New York State Museum

CORN-GRINDING TOOLS

When the stone mortar was used, the small stone was used as a pounder or roller. The wooden mortar was probably made by burning a hole in a log.

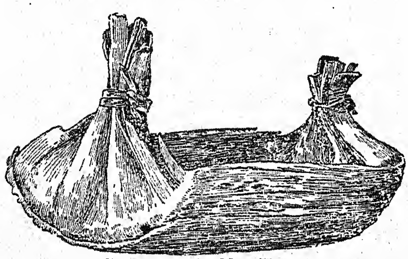
season they boiled the corn, scraped it from the cob, and dried it in the sun, or they roasted or parched the corn and shelled off the kernels. At the height of the fishing or hunting season they took their surplus catch and either dried it in the sun or smoked it over their fires, or both. When corn and squashes and nuts were ripe, they harvested these foods and stored them.

And they had tools for storage. Tubs, barrels, and trays, made of bark (most frequently of elm bark) and fastened together with vines or animal tendons, were for them the bins and bags of the modern housewife. Then, too, they had learned to make pits or caches, sometimes lined with furs or

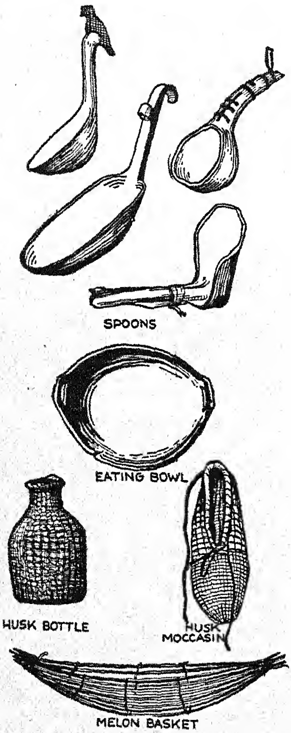
bark, in which they kept almost all the items of food listed above. Sometimes these caches were in the long house under or near the fireplace. Sometimes they were outside the long house. Neanderthal man would have been greatly amazed and delighted by such tools and devices, simple and primitive as they seem to us to-day.


POTTERY

Now, all this meant that the Iroquois had a range of diet that was utterly unknown to Neanderthal man. They had many corn preparations (someone has said more than twenty), beans, squashes, meat, fish, maple syrup, maple sugar, nuts, berries, fruits, and even a sort of tea made by boiling the sassafras root in maple sap. One of their favorite dishes was *sagamite*, which was parched corn ground up and boiled (making what we sometimes call mush), seasoned with fish, meat, fruit, maple syrup, or bear fat. Corn, beans, and squashes might all be boiled together as succotash and even combined with meat in a sort of goulash. All told, it was not a bad living. What we need to remember is that they had a fairly good living because they had learned to harness nature by using tools and by raising crops and by preserving and storing some of their foods.


Courtesy of the New York State Museum
BARK TUB

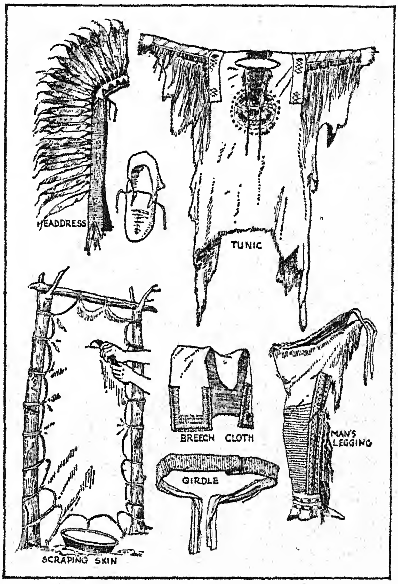
Eating utensils. — They had made a beginning, too, of tools to eat with. They knew how to make spoons or ladles of wood, bone, or horn. Crude plates were made of wood. However, we must not picture these savages seated around a mahogany table with napkins and finger bowls eating meals served in courses. Everybody took his supply at mealtime from the common kettle of the group, which ordinarily meant the common kettle of the whole long house. The men ate first, then the women and children, and both groups ate with scant ceremony.



Clothing-making and its tools. — Upon the whole, the Iroquois did not fare as well in their clothing as they did in their food. What we call textiles were practically unknown to them. It is true that they did make a few mats and rugs from corn husks and reeds, and they did know how to make a little crude "cloth" from the inner fibres of the elm and from the fibres of the hemp plant, but the Iroquois squaw was not really a weaver. She had reached only that stage in man's long climb upward which enabled her to adapt the skins of animals into clothing.

In this she was really quite skillful. She took the "fresh" or "green" skin, stretched it, and pegged it to the ground. With a flint scraper she scraped off any loose flesh, and sometimes she removed the hair in this same way. Then she

soaked the skin in a mixture of water and deer brains or liver or fat, and kneaded it carefully with her hands. Some skins were cured still further by exposing them to smoke. The result was a very passable "buckskin" from which, and from undressed skins, could be made the five characteristic pieces of clothing of the ordinary Indian — the breech cloth, the tunic, leggings, moccasins, and the robe or blanket. These garments were "cut out" with flint knives and were then sewed together with strings or thread made from animal tendons. Bone or wood needles and awls were used for the purpose. Sometimes the garments were rather prettily decorated by the use of porcupine quills, stained or otherwise, and by the use of shell beads and dyes of various colors. They were sometimes embroidered, too, with hair dyed in a variety of colors.



Each group was self-sufficing. — We need to keep in mind one very important matter concerning the household arts of the Iroquois. It is this: each little local group made all its own utensils; prepared, preserved, and stored all of its own foods; made all its own clothing; and was in general what we call self-sufficing. This means that one group did not depend upon others to get the means of gratifying its wants. Each little group met the situation itself.

You know how different the situation is to-day. Take your own home, for example. The wall paper, the furniture, the rugs, the cooking utensils, the stoves (to mention only a few things) were all made outside the family; in most cases they were made in huge factories and shipped to your town and sold to your parents by merchants. Even your food and clothing are made or prepared largely by others. You need only to recall your various breakfast foods, some of which are not even cooked in your home; your bread, which your mothers may or may not bake, but which is in any event made from flour or meal ground in a mill hundreds or perhaps thousands of miles from your home. Baking powder, flavoring extracts, pepper, cloves (all of which were, of course, absolutely unknown to the Iroquois) are bought from the grocer, who bought them from another, who bought them from another, who bought them from another, and so on back to the growers or makers.

The household arts with which we are familiar are just the finishing touches to a lot of work which is now done outside the household by farmers, manufacturers, wholesalers, and retailers. Our households are not self-sufficing. Each household depends upon many other persons to prepare or partly prepare food, clothing, and our various conveniences and luxuries of the home. We say that we are *interdependent.*

C. The Iroquois as Communicators

(Speech, the forerunners of writing, transportation, trade, and the beginnings of money.)

We have already seen that as far as communication was concerned, Neanderthal man was in a bad way. He could make faces, he could shrug his shoulders, he could shake his fist; but he could talk only a little. His words were so few that he must have had a difficult time in his communicating.

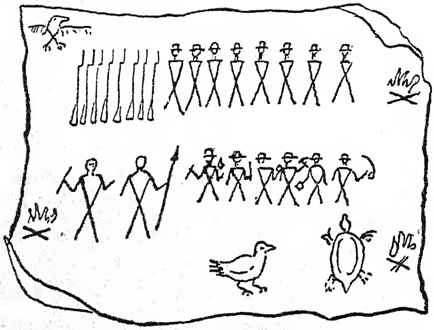
The Iroquois were great communicators. — Of course neolithic man had no such modern communicating devices as newspapers, telephones, telegraph, wireless, the post office, schools, or churches, but they were, nevertheless, fairly good communicators.

Speech. — We can see how much speech meant to the Iroquois by the way they used it in their councils. Every important happening resulted in a council being called. It might be a council concerning whether to go on the war path against some other tribe; it might be a council to elect a chief to take the place of one who had died; it might be for some other important purpose. Whatever the purpose, at every council there was much speech-making. The Iroquois, indeed, were known far and wide as great orators.

THE STORY TELLER

Another sign of the importance of speech is found in the work of the story-teller. In every group there was quite certain to be some one who had come to be known as a good story-teller, and this story-teller always had an interested audience. He recited to them all sorts of things: the Indian account of the way in which the world was made; stories of Indian gods or spirits; stories of the wise actions of chiefs either living or dead; stories of witches; stories of great events in the history of the tribe; stories of fact; and stories of fancy. All were eagerly heard. It was one of the most important ways by which the young

people learned the wisdom of the tribe. Indeed, the story-telling was such a temptation that by tribal custom the story-teller was forbidden to tell his stories in the summer season (we say there was a *taboo* upon it) when there was much work to be done. He must confine his story-telling to the winter, when work was not so pressing. It would be hard to find a clearer proof of man's love of talk than this.



PICTURE WRITING

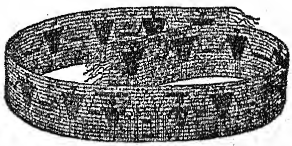
This picture says that two Indian guides, eight soldiers, and six officers and geologists camped here and had a prairie chicken and a turtle for supper. They had three campfires.

But the Iroquois was not able to write. He had no alphabet and no writing as we understand that word. We cannot tell the story of the development of the alphabet at this time; that will come in Chapter VII. But we can at this time see what the Iroquois Indians were doing that might have led to writing if the white people had not discovered them for a few thousand years. Such things have led to writing among other peoples, as we shall see.

Picture writing. — To begin with, there was their so-called picture writing. This means simply that they would draw crude pictures which told some story. A group on the war-path, for example, might draw on a tree pictures telling how many there were of them, in what direction they had gone, and even what they had done to the enemy. In a village there might be a war post with accounts of the wars on this post in picture writing. One sign would mean a war, another sign would stand for a scalp taken, still another sign for a

prisoner taken alive, and so on. This war post would become for those who knew what the signs meant a written record of happenings. Of course, one had to know what the signs meant, but so do you with these signs you are now reading. Our letters and words are, after all, merely signs that we have learned to understand.

Wampum writing. — They had a sort of wampum writing too. Now, this was really not writing at all. It was much like your tying a string around your finger when you want to remember something important. Every time you look at the string it brings back to your mind that which you wish to remember. The Indians used wampum strings or wampum belts in just that way. The wampum bead was a piece of shell that had been perforated and made into a bead. When an important thing happened in the history of the tribe, as for example when they made a treaty with some other tribe or later with the white man, they wove a lot of these wampum shells together in such a way that the persons who saw it done would understand that the string or belt stood for a story.



Courtesy of the New York State Museum

THE WASHINGTON WAMPUM BELT

The belt commemorated the peace treaty between the Iroquois and the United States during the presidency of Washington.

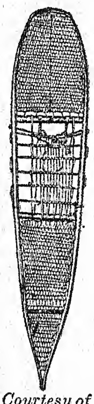
Of course, what the belt meant would be forgotten unless people kept reminding themselves of the story. Accordingly, at some of their councils, the chief whose duty it was to keep the wampum records would rise in the council meeting with his belts and strings and would recite to the council the laws and treaties and happenings woven into these belts. In this way such records were passed down from generation to generation.

They had transportation devices. — *Trails.* — If Neanderthal man had any roads or trails, it was very likely more or

less by accident, and they were probably made with little more intelligence than cow paths are made by cows on one of our farms to-day. The Iroquois had no roads as we use that word to-day, but they did have trails that were laid out with great care and skill; with such care and skill, indeed, that some of our roads and railroads follow old Indian trails. These trails were their highways from one village to another and from one tribe to another. They were, too, their highways out into fishing territory, hunting territory, or the territories of their enemies. Since they had neither horses nor cattle, these trails were of course merely footpaths, but they were used so much that even to-day in certain places they can be seen as little troughs that were beaten out by the feet of generations of savages as they went about their daily affairs.

Courtesy of the Smithsonian Institution

Land-transport devices. — Since they had no beasts of burden and, of course, no wheeled vehicles, their carrying of things overland was upon the human back. For this purpose they had developed the burden strap shown in the picture above. If this seems very simple and crude, remember that Neanderthal man probably could not even tie up a bundle of sticks to carry into his cave.



Courtesy of the Smithsonian Institution

A SNOW SHOE

For winter use they had their snowshoes, on which a good traveler might make as much as fifty miles a day, and they had learned to make sleds having curved runners lashed together. The sled was, of course, always pulled by either a man or a woman (generally a woman) and not by a tamed draught animal.

The canoe. — But their easiest transportation was on the water with the famous Indian bark canoe. The canoes that the Iroquois themselves made were generally made of elm bark, and they were not entirely satisfactory, since elm bark warps too readily. Much better canoes were made in the north where birch bark was available, and sometimes the Iroquois bought birch-bark canoes from these northern tribes. These canoes, whether of elm or of birch, carried considerable loads, and were themselves so light that they could be carried overland from one river to another, or from one lake to another, if no water channel existed.

The beginnings of trade and of money as a language of trade. — Buying and selling are really one form of communicating with other people, a form in which money is the language that is used. The Iroquois had made a beginning of this kind of communication. It was only a beginning. They had very little trade either among themselves or with other people. What little they had took mainly the form of "present giving." They managed it in this way. One person, or perhaps a group, would go with his goods to some other individual or group and, in a very formal and ceremonious way, he would make presents. It was quite understood, however, that when a present was made, the person who received it was to give a present in return. If the presents pleased both parties, both were content and a trade had taken place. You may have heard of "Indian giving," and it probably means to you that after a present has been made it is taken back again. This sometimes happened in the kind of trade we have been talking about. If a trader was not satisfied with the presents he received, he would return them and take back the things that he had given, unless a more acceptable present were offered him. This is trading, but it is very slow and awkward trading.

The Iroquois had the beginnings of the use of money as a language of trade. They did not have money in the form of coins or paper notes as we have it to-day. They used for this purpose these same wampum beads that we have been talking about. As time went on, they came to trade their furs, their canoes, their corn, etc., for these wampum beads. Thus it came to pass that a person who owned much wampum was a wealthy person, which meant merely that since he had much of it, he could buy many other things with it. After all, that is what money means to us to-day. It is a tool we use in trading. We talk of the various goods we trade not only in terms of yards or pounds, but also in terms of money. It is a language of trade.

D. The Iroquois as Teamworkers and Planning Organizers

(Social organization as seen in family, clan, and village life; in tribal and league government; in division of labor; in religion and other means of social control; in property rights; in play and recreation.)

Thus far we have talked of tools, of harnessing the forces of nature, of speech, and of money as the language of trade. We come now to some new terms. We wish to talk of groups, or communities, or societies. Let us see what such terms mean. A *group* is any number of people, whether large or small, who think and talk and act about the same things in much the same way; that is to say, they have common interests. This is also a definition of a community or a society, though we sometimes use the word *community* to mean a fairly large group, such as a village or a city; and we sometimes use the word *society* when we speak of a very large group, such as the United States. The word *group* is the easiest one to use. A family is a group, the school is another group, as is also a trade union, a city, a state, or a class in a

school. The Iroquois had such groups as the family, the long house group, the village, the tribe, the confederation, the war group, the hunting group, and the gens.

The Iroquois family group was not just like ours. — Let us begin with what we call the family. To us that means father, mother, and children living together in a separate house or apartment, but it did not mean this to the Iroquois.

Marriage. — The Iroquois young man and young woman did not arrange for marriage in the same way that the people we know arrange it. Ordinarily the young people of to-day become acquainted, and they themselves decide, usually with the consent of their parents, to marry and set up a home of their own. Among the Iroquois, however, the young people had little or nothing to say about the matter and neither had their fathers. The two mothers arranged everything. It is true that the young people had usually become acquainted at the dances, festivals, and other happenings of the village life. It sometimes happened, however, that they hardly knew each other and knew nothing of any plans until after the marriage had been announced by the mothers!

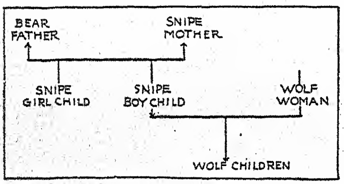
As for the marriage ceremony itself, you would not recognize it as such. One writer describes the ceremony thus:

> The maiden was taken by her mother and a few female friends to the home of the intended husband. She carried in her hand a few cakes of corn bread, which she presented to her mother-in-law as a token of her usefulness and skill in the domestic arts. The mother of the young warrior then gave to the mother of the bride a present of venison or other fruit of the chase as a token of his ability to provide for his household. This exchange of presents bound the new pair together in the marriage relation.[1]

Family life. — After marriage the Iroquois young people did not set up a new home as is usual among us. "Household" meant not a family, as it means to us, but the long house

[1] Adapted from Morgan, *The League of the Iroquois.* (Dodd, Mead & Co.)

where there lived all the members of a particular gens which, as we have seen, was represented by some animal or bird. The bride stayed with her gens; the groom continued to live with his gens. True, there might now be another compartment added to the long house for the bride. Indeed, this was fairly certain to be done after there were children, but even then the father usually continued to live in the household of his own gens. The children were known as belonging to the gens of the mother. For example, if a man of the bear gens married a woman of the snipe gens, each continued to live in the long house formerly occupied. The children, both boys and girls, belonged to the snipe gens.



As a consequence, many things in the Iroquois family were very different from the family with which we are familiar. The father paid little attention to the children, especially in their earlier years. They belonged mainly to the mother. If, for example, the father was a chief of the bear gens, his son could never become chief in his place because his son belonged to the snipe gens. So, also, such small property (we shall hear more of property and property rights later) as the father may have owned did not go to his children upon his death, but was divided up among his near relatives in his own bear gens. The property of the snipe mother, on the other hand, went to the children, since they were "snipes." You can readily see that the family was not as close and unified as is our family to-day. It was just a part of the large household or long house of the mother's gens.

It is clear that our kind of family group is by no means the only possible kind. In this, as in all other matters, we ought

to be cautious about ever assuming that our way is the *only* way things can be done.

The Iroquois had the beginnings of specialization. — It is interesting to see how tasks had come to be divided up between men and women. The man was in the main the warrior, the hunter, the fisherman, and the trader, but he did help with other work. He made, or helped to make, weapons and agricultural tools, helped clear the site of the village, helped in the heavy work of building houses and palisades, and helped in clearing ground for agriculture. The women did the bulk of the agricultural work. They sowed, they tilled the land, they harvested and preserved their agricultural crops, as well as the nuts, fruits of the forest, and roots. They helped make the household tools, made the clothing, prepared the food, and carried most of the loads on the journeys they made with their husbands. This dividing of the work between the sexes is one form of what we call "division of labor" or "specialization." We shall hear a great deal of other forms as we go on in this book. Of course, we have "divided our labor" or "specialized" much more than the Iroquois had done.


GATHERING WILD RICE

Longfellow, in his *Song of Hiawatha,* has described the Indian division of labor in never-to-be-forgotten verse. One can almost see the old warriors sitting by and watching the women work. Among the Iroquois there was likely to be feasting at the husking bee Longfellow describes, and you may be certain the old rascals would not be far away from the kettle of corn and beans. But it was not at all the customary thing for them to aid in the harvesting.

There was peace among the nations;
Unmolested roved the hunters,
Built the birch canoe for sailing,
Caught the fish in lake and river,
Shot the deer and trapped the beaver;
Unmolested worked the women,
Made their sugar from the maple,
Gathered wild rice in the meadows,
Dressed the skins of deer and beaver.

'Twas the women who in springtime
Planted the broad fields and fruitful,
Buried in the earth Mondamin; [the corn]
'Twas the women who in autumn
Stripped the yellow husks of harvest,
Stripped the garments from Mondamin,
Even as Hiawatha taught them.

Then Nokomis, the old woman,
Spake, and said to Minnehaha:
"'Tis the Moon when leaves are falling
All the wild rice has been gathered,
And the maize is ripe and ready;
Let us gather in the harvest,
Let us wrestle with Mondamin,
Strip him of his plumes and tassels,
Of his garments green and yellow!"

And the merry Laughing Water
Went rejoicing from the wigwam,
With Nokomis, old and wrinkled,
And they called the women round them,
Called the young men and the maidens,
To the harvest of the cornfields,
To the husking of the maize-ear.

On the border of the forest,
Underneath the fragrant pine trees,
Sat the old men and the warriors
Smoking in the pleasant shadow.
In uninterrupted silence
Looked they at the gamesome labor

Of the young men and the women;
Listened to their noisy talking,
To their laughter and their singing,
Heard them chattering like the magpies,
Heard them laughing like the bluejays,
Heard them singing like the robins.

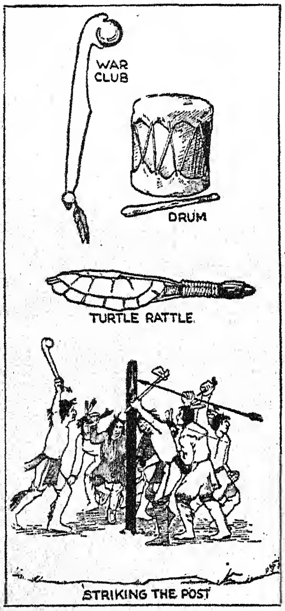
And whene'er some lucky maiden
Found a red ear in the husking,
Found a maize-ear red as blood is,
"Nushka!" cried they all together,
"Nushka! you shall have a sweetheart,
You shall have a handsome husband!"
"Ugh!" the old men all responded
From their seats beneath the pine trees.

The next larger group was the village. — The family and the household were thus the smallest groups among the Iroquois. They were what we call primary, or face-to-face, groups, which means that all the members met one another face-to-face. The next larger group was also a face-to-face group. It was the village. The picture on page 26 shows that several long houses were to be found in a village; sometimes, indeed, a village was made up of several scores of them. It was quite unusual, however, for the villages to be very large; probably a village of four hundred Indians would be regarded as quite good sized. As you can see from our account of the family life, there were likely to be in each village several gentes, and each gens had its own long house, or more than one long house if the numbers in the gens made it wise to build more houses.

This village group was mainly self-sufficing. As we have seen, it did carry on some little trade or present giving with other groups, but in the main each village produced its own stuffs and ate its own stuffs. Indeed, each gens was largely self-sufficing. Usually the men of a given gens went hunting

or fishing together, and the women of a given gens carried on their agriculture and other duties together.

Coöperation in peace tasks. — We need to notice that the Iroquois had learned that it pays to have teamwork; it pays to coöperate. There were, of course, cases where a single warrior hunted and fished by himself, and perhaps there were a few cases where a woman tilled a separate plot of land. But, as a usual thing, they hunted or fished or worked in groups. Indeed, the women workers usually had one of the older women of the gens acting as supervisor when they worked in the fields. It was what we should call a very democratic coöperation. They chose their own leaders, whether for the tasks of war or for the tasks of peace, and they worked together with these leaders wholeheartedly.



Coöperation in war.—What happened when some members of the village decided to go on the warpath shows how democratic the Iroquois were. A council would be called (no Iroquois would do anything important without a council), and men would gather either in a long house built separately for such councils, or around a council fire out in the center of the village. Although the village had a person who was a sort of war chief, anyone could lead a war party, and anyone could join it. The way to organize a war party was to hold the war dance. A leader of a small group would start the dance in a close circle. As the dance went on to the

beating of drums and the shaking of rattles, war songs and speeches encouraged others to rise and join the dance. Those joining the dance indicated by that act that they intended to join the war party. We should not think of organizing an army by just these methods!

The dance itself was an interesting ceremony. It represented the actual fighting. One man would pretend to be attacking and another to be defending himself. Here would be one in the act of drawing an invisible bow, another pretending to strike with the war club. Others would be listening, watching, or struggling with the enemy. They would act out the stealthy approach to the enemy camp, the shouting, striking, and scuffling of actual combat. The next morning the party would be off in full paint and feathers with their long bows, sheaves of arrows, and war clubs.

Above the village was the tribe. — The next larger group above the village was the tribe, which was made up of several villages, the number depending upon the size of the tribe and the size of the villages. As we saw, there were five of these tribes, the Mohawks, the Oneidas, the Senecas, the Onondagas, and the Cayugas. The tribe as a whole had little to say about the ordinary affairs of life. All these ordinary affairs of life, even including the punishment of criminals, were handled by the village or by the gens. The whole tribe held a council only on very important occasions, such as when a great war was to be declared or a great treaty of peace made or a new sachem (a great chief) elected to take the place of one who had died.

Above the tribes was the League. — These five tribes were united, as we have seen, in a great league, or confederacy, called the League of the Iroquois. One tradition has it that the five tribes were having a rather sad time of it warring among themselves and that a great Onondaga law giver,

Daganoweda, called them together and arranged for this league. Probably it did not happen just that way. Probably the league was formed very gradually as a result of experiments running over hundreds of years.

The league was "governed" by sachems and councils.— There were in the league fifty sachemships which were distributed among the five tribes. These fifty sachems, or great chiefs, and the great annual council that they led were really the league government. In the autumn a council of the league was held at Onondaga, and here great matters were talked over. War was declared, peace was made, ambassadors were sent to other peoples, other peoples who had been conquered were told how they would be governed, etc. In these great councils the fifty sachems were, of course, the most important men, but smaller chiefs were also heard, and even the ordinary warriors and the women could make their wishes known through persons chosen to represent them. After the great council was over, each tribe went back to its own territories, its sachems going with it, and the central government ceased to be until the next annual council, or until some special council was called.

An account of a special council. — As an example of a special council, let us study one called for the "raising up" of a new sachem to take the place of one who had died. This was called the mourning council. Suppose that an Onondaga sachem had died. The Onondaga tribe would arrange to elect his successor and would send a runner with a belt into which a message had been woven to the next tribe. This message was that an Onondaga sachem had died and that a mourning council was to be held and his successor "raised up." This next tribe would send word on to its neighbors. Finally the whole Iroquois League would hear of the council, and thousands of people, young and old, men, women,

and children, would set out on the trails to the place of meeting.

When the time for holding the council arrived, each tribe marched to the council, led by its sachems and war chiefs. The sachems and chiefs stepped forward and walked around the council fire, singing songs of mourning. At the end of the singing, the peace pipe was passed around. Then the sachems made speeches, one after another, and the belts of wampum, which had been sent out to announce the council, were returned to the senders. The various bands then marched up to the council fire singing their mourning songs. The mourning for the dead sachem was long and solemn. His brave and good deeds were recited.

Courtesy of the New York State Museum

EAGLE DANCE

They are imitating the hopping of a bird. An Iroquois drew this picture.

Then came the raising up of the new sachem. This was a ceremony of many songs, speeches, and replies. After the new sachem had been raised up, the Onondaga sachem who was the keeper of the wampum recited the ancient laws and customs of the great League of the Iroquois. He read these laws, as we have seen, from belts of wampum into which the records had been woven. These wampum belts were carried from one group of sachems to another to be read and explained, and the new sachem in particular was told their meaning. It was necessary for him to learn all about the laws and customs so that he would be a wise councilor. Finally, the new sachem was presented to the people.

With the raising up of the new sachem the mourning for the old sachem was over and the feasting and celebration

began. Several days were passed in games, feasts, and dancing. Then, one by one, the tribes broke camp and set out toward their various villages.

Do you know how all this compares with the inauguration of, say, the governor of one of our states?

There was social control among the Iroquois. — As we have seen, a group or society is made up of persons who think and talk and act about the same things in much the same way. In every such group or society it always happens that what is done is very much controlled by the group. We call this group control, or social control.

Control by "government" of the league or tribe.—There are many forms or kinds of social control. There is, for example, control by the government. It is clear that the League of the Iroquois had a sort of government and that this government controlled in the more important league matters, such as declaring peace or war. It is also clear that each tribe had a government. Tribal councils had control of important tribal matters.

Control through gens and village councils. — For the ordinary man, however, the group control that was most felt was that of his gens and village. As an illustration of how this worked out, let us see what happened when anyone needed punishment.

If one Iroquois killed another, the gens to which the murderer belonged must send a present of much white wampum to the gens of the victim. If this was not sent, the victim's gens would appoint an avenger who was to take the life of the murderer. This planning was, of course, all worked out through the usual councils.

If anyone became a traitor to the group or was supposed to practice witchcraft, he became an enemy of all, and a council decided his fate. He might be executed or he might be de-

clared no longer to be a member of the group. Such a declaration was almost equal to an execution, for then every member of the group was free to kill this enemy, this person who did not belong to the group. The Iroquois, as well as most other early societies, considered any person who did not belong to the group an enemy.

Control by custom and group opinion. — The punishment for lesser wrongdoing, however, was usually worked out through group opinion. The Iroquois, as is true of most savage peoples, did not change their ways of doing things very much as time went on. They kept on doing what had always been the customary thing. Their traditions and customs were well known by all members of the group, and anyone who disregarded them did wrong in the eyes of the group. His punishment came by feeling the scorn and anger of other members of the group. It is a little hard for us to understand this way of doing things, for we are not so much bound by custom and tradition. We feel more free to experiment and to do things a little differently from the way they have ordinarily been done. But even we are much bound by custom, and we know something about being punished by group or public opinion. You can name several things you would not do because you would not wish to bring down upon yourself the dislike of your friends. This feeling was very strong among the Iroquois and took care of many things that we to-day take care of by means of law and the policeman, or by other means.

Religion was an important form of their social control. — The ordinary person was controlled in part by custom, tradition, and group opinion, as we have just seen. He was also controlled by religion. Let us see what that means.

"Explaining" the world. — It is hard for us to understand the religion of a savage because it is hard for us to think of

things in the way he thought of them. Let us think of his religion as his effort to understand the world about him. Let us remember that many things we understand quite well were very puzzling to him — were "magic" indeed. For example, you and I know enough about lightning to know that it is caused by the same electricity that is in our electric-light wires. Not so the savage. Some "spirit" must be behind the lightning! You and I know that germs cause diphtheria. Not so the savage. An outbreak of diphtheria must have been caused by angry spirits! The sun's regular rising must, to his way of thinking, be governed by a spirit. A meteor (shooting star) must surely be a spirit with streaming, flaming hair! And so it went. The savage mind was full of fears and superstitions about the world in which he lived.

THE METEOR SPIRIT

But let us remember that his notions about the world, strange as they seem to us, were his "explanations" of that world.

Dreams helped cause belief in many spirits. — Apparently many of his explanations grew out of the fact that he often dreamed as he slept. In these dreams he seemed to see persons who were at the time far away. Some were, indeed, dead. He saw also animals, trees, etc. He, himself, in his dreams "went away from his body" to other places. He thought he *must* have gone away from his body, for his body was in one place and he saw another place in his dreams! Then, too, a fellow tribesman would occasionally fall in a fit (which seemed to the Indian a sleep from which he could not be awakened), and upon recovery he would sometimes tell of

strange "experiences" while he "was away from his body." We can readily see how he arrived at his crude notions of his "soul," as we should say it. He could easily believe that animals, birds, fish, trees, rocks, and all the other things he saw in his dreams also had souls.

You see, his religion was not like ours. Before the white man came, the Iroquois had not learned to think of there being only one great spirit. They thought there were multitudes of spirits. They had a vague notion that everything could think and act just as men could, and that it was wise to be friends with the spirits of everything. There was the spirit of the sky, of the sun, of the rain, of the winds, of frost, of hail, of stones, of trees, and of animals, to mention only a few. Some spirits were good spirits, and they were to be praised and thanked. Other spirits were evil spirits, and they should be soothed and kept from getting angry! It is not surprising that when a youth "came of age," he went to some quiet place to fast, hoping that he would see in his dreams some animal that would from that time be a sort of guiding spirit to him. That animal would be thought of as his "good medicine."

The Heno myth typical of their myths. — All sorts of tales (we would call them myths) were told by them about the spirits. Heno, the Thunderer, was one of the most kindly of spirits. He brought the rain, helped the crops grow, hated and killed serpents and "false faces," or bad spirits. He carried on his back a great basket of boulders, and he threw them at evil spirits in the sky. If he missed, these boulders fell to earth as balls of fire. This, of course, was the lightning.

Heno now lives "in the west" in the skies. He used to live under the falls at Niagara, but his home was destroyed in this curious way. When he was still living under the falls, so one myth goes, there was a village up the river whose

people were dying of pestilence. Heno told them that the trouble was that there was a great serpent in the ground that wanted to eat their dead bodies. This serpent accordingly poisoned the river so that there would be more bodies buried. Heno advised the villagers to move up Buffalo Creek.

This they did. The serpent missed its usual meals, and, putting its head above the water, it discovered what had happened and went up the creek after them. Heno gave it a mortal wound with a great thunderbolt. The serpent turned to rush down the river and escape, and in its turning it bulged the shores of the creek out into bends which still remain. But it could not escape. Heno followed it with his thunderbolts.

Courtesy of the New York State Museum

HENO, THE THUNDER SPIRIT

This picture was drawn by an Iroquois. The artist evidently thinks of Heno's arrows, rather than boulders, as the source of lightning.

The great carcass of the serpent floated down the river and lodged at the falls with its huge bulk reaching upstream in the form of a half-circle. This dammed the water. Finally, so much water gathered above the serpent that it crumbled the rocks under the body and formed the great horseshoe falls of Niagara. Of course, this destroyed Heno's home under the old falls.

Stories like this were told of all sorts of spirits. They furnished, indeed, a large part of the subjects for the village story-tellers. Of course, these stories were believed by the children who listened to them, and became a part of the religion of the people.

Dances, festivals, and games were partly religious acts.—While they had no churches, they had a very definite system

of worship of their spirits. This worship occurred partly in their score or more of dances, upon which they thought the spirits looked with great favor, and partly in their festivals or thanksgivings, of which they had six. The maple festival, designed to return thanks to the maple tree for its sap, was really a spring festival. Then came the planting festival. Later there was a strawberry festival — really a thanksgiving for early fruits; and then came, in order, the green-corn festival, the harvest festival, and the new-year festival.

The green-corn festival. — The green-corn festival came when the green corn was ripe enough to be used, and it lasted for four days, each day ending in a great feast of succotash made of corn, beans, and squashes. On the first day came the thanksgiving address, the feather dance, and three or four other dances. On the second day came the thanksgiving dance, which was much like the feather dance except that many speeches of thanksgiving were made in the intervals of the dance. These speeches were very short, running like this: "We return thanks to the maple which yields its sweet waters for the good of man." Similar speeches returned thanks to the bushes and trees, mother earth, herbs, rivers and streams, the three sisters, the moon, the stars, the sun, and especially to grandfather Heno.

THE FEAST OF THE CORN.

On the third day came the thanksgiving concert made up of many short thanksgiving speeches, each speech closing with a song made up by the singer, with all the people joining in a sort of chorus. This thanksgiving concert was concluded by several dances.

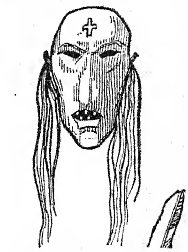
The fourth day brought the festival to an end with a game of chance, their famous peach-stone game. Two players sat opposite each other. In a bowl between them were six peach stones which had been burned black on one side. The bowl was shaken and the player lost or won according to the number of black sides which were up at the end of the shaking. The two players were likely to find themselves in the midst of a yelling, shouting, sweating group, and betting ran high. The game might last a half day or even longer.

No priests or preachers. — There was no special set of persons who acted as priests or preachers. Certain of the warriors or chiefs were "keepers of the faith," who made arrangements for religious festivals and dances, but they did this as only a small part of their work in the tribe.

GAME OF PEACH STONES

There were also the "medicine men," who were supposed to have special influence over spirits and who were particularly likely to be called upon when, for example, rain was needed or an enemy was to be defeated. They were also called upon when anyone was sick, since it was believed that any serious sickness meant that the spirits were displeased. It was a curious sort of doctoring as we think of such matters. They did make a few simple medicines from herbs, and this was real doctoring, even if it was frequently very poor doctoring. A good part of the doctoring was, however, as you can see, connected with their religion. It was the business of a medicine man to coax or scare the evil spirits from the body of the sufferer, and he was likely to do this with much shouting and drum beating and pummelling of the patient.

Religious beliefs influence actions. — In this account of the religion of the Iroquois, we have been interested not so much in seeing what they believed, as in understanding that their beliefs would make them act in certain ways; that religion is one form or means of social control. We can understand, without any further explanation, that they would wish to act in a way that was pleasing to souls and spirits and that their religion was an important part of their living together. For that matter, religion is always an important part of the living together of any people.



MASKS FOR CEREMONIES

How the Iroquois owned things. — There were certain things that every Iroquois warrior could call his own, such as his pipe, his weapons, and his clothing. So also there were certain things that each woman owned, for example, her tools, her clothing, and her ornaments. Most other things, however, did not belong to separate persons. Most things belonged to the gens, the tribe, or the league.

The league, as such, did not own much of anything except its wampum records and such wampum as might be in a sort of league treasury. Much the same thing was true of the tribe. It might have a sort of treasury of wampum, and it could say who could settle in its territory, who could hunt and fish there, and who could pass through. Most things, however, were owned by the gens. It owned the long house. It owned or at least controlled the land it cultivated, the lakes or rivers in which it fished, and the common kettles and other utensils of the group that lived in the long house.

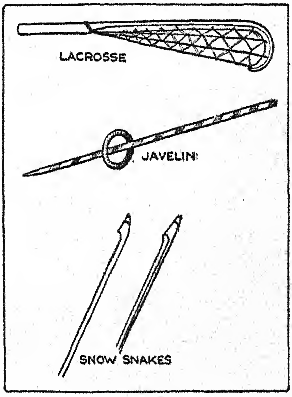
This did not leave much to be owned by individuals. True, some warriors were luckier than others at games of chance and won property in this way. True, a hunter usually owned the skin of the animal he killed, even if the carcass was turned over to his gens. True, the old medicine man was not above selling his "control of spirits" for wampum. But after all, food and shelter were available for everyone in the long house, and the agricultural land and the hunting and fishing grounds were open to all. They had, in other words, only the beginning of what we call *private property,* which means that private persons own most things. Among the Iroquois most things were owned or controlled by the group — by the gens. You will find as we go along in our study that we have come to make more use of private property, but we shall have to postpone the reasons for this to a later study.

The recreation of the Iroquois. — Life was by no means all drudgery with the Iroquois. They used games and sports in their religious ceremonies, and they also used them as we use them to-day — as a means of recreation and as a means of preparing the young to live well in the group. Did you ever stop to think that our games help teach us how to use our heads and hands, and help us to learn teamwork?

Their favorite amusement was the Indian game, lacrosse, which has since been adopted by many other peoples. *Lacrosse* is a French word meaning "the hooked stick." The name comes from the fact that they used in the game a sort of racket, or stick with lacings, as shown on the opposite page. The point of the game is to carry or throw a ball by means of this stick between two upright posts, or goals, each team defending its own goal. Sometimes the game was played between matched teams as we might have a game of football or baseball to-day, but it was also a game in which whole villages, men, women, and children, could take part.

We are told, indeed, of one lacrosse game in which there were two thousand players.

Although lacrosse was their favorite game, it was by no means the only one. They had a javelin game in which they tried to throw the javelin through a ring as it rolled along the ground. They also had another javelin game which was lost or won according to the distance the thrower succeeded in making the javelin go. The deer-button game was very much like the peach-stone game that has already been described. There was also a snow-snake game that consisted in sliding a stick called the snow snake over a course of snow. There were, of course, archery contests, running contests, and many other forms of athletic sport.



Summary and conclusion.—This has been a rather long story of our Iroquois friends and it is, therefore, worth while to think back over the whole story and get its main points in mind.

1. *The harnesser of nature.*— The first point standing out is the fact that the Iroquois lived much better than did Neanderthal man. In large part this was because they knew better how to use tools, because they were better harnessers of nature. This fact came out in our discussion of their weapons, of their shelter, of their household implements, and of their agriculture. The Neanderthal people were appropriators; the Iroquois were appropriators and adapters; we are to-day appropriators and adapters and creators, and our greater ability to harness nature means greater ability to live together well.

2. *The communicator.* — The Iroquois was a better communicator than was Neanderthal man. He became as a result a better planner. True, he had only the beginnings of communicating with other people as far as trading with them was concerned, but he had made this beginning. We saw that his trading gave him birch canoes which were better than the elm canoes he could make himself. From the whole story of the Iroquois as communicators we get the idea that we ourselves can live together better by communicating with others, both in speech and in writing and in exchange of goods. We begin to see money as a language of trade.

3. *The social organizer.* — The Iroquois were teamworkers; they coöperated; they made plans and worked together in carrying out those plans. They pulled together in the gens, in the village, in the tribe, and in the league. They pulled together in hunting, in tilling the soil, in war, and in play.

They accomplished more by coöperating than they could have accomplished if each had worked or fought alone. This gives us a hint that we ourselves shall live together well to the extent to which we are coöperators and planning organizers.

The Iroquois had group or social control. They had government and law, but their social control was worked out mainly through custom, religion, and group opinion.

4. *The idealist and aspirer.* — In their religion we catch a glimpse of "man the aspirer," for in their religion they were seeking the explanation of things. And, of course, they had their notions of right and wrong; of good and bad ways of living together. In other words, they had ideals.

And now let us remember that we have been studying the Iroquois as an example of how man lived when he had progressed to the neolithic stage. The powers of neolithic man were greater than those of Neanderthal man. They

were greater because neolithic man was a better harnesser of nature, a better communicator, a better coöperator or social organizer, and a man of higher ideals and aspirations. These are the four great forces or factors in living together well.

Problems

1. The Iroquois had no metals. What did they do for nails? For cooking utensils? For cutting tools? For hammering tools? For drilling tools?

2. In the account of how the Iroquois lived, we had almost a complete list of their tools and devices, and it did not take up much space. Would it take much space to list all our devices to-day? Are they all listed in a mail-order catalog? How does it happen that we have so many?

3. How do we store our foods to-day? Does the housewife store any? Does the grocer? Does the wholesaler? Does the grower? What are grain elevators? What are cold-storage plants? Have we ways of preserving foods that were unknown to the Iroquois?

4. Some Indian tribes had no pottery. They boiled meat thus: they dug a hole, lined it with the skin of some large animal, put in water and raw meat and then threw in red-hot stones from a near-by fire. This is "hot-stone boiling." Is this a tool? If it is, give reasons why it is not as good a tool as pottery.

5. The Iroquois squaw sewed skins with a bone needle and with thread made of animal tendons. What do we use to-day? Not much of our clothing is sewed by hand. How is it sewed? Is it all sewed in the home?

6. Make as long a list as you can of the devices we use in communicating with one another to-day. Do the same in the case of transportation devices.

7. In what big ways did the Iroquois harness nature better than did Neanderthal man? Do we harness nature better than did the Iroquois?

8. Notice the range of diet of the Iroquois (p. 37). Compare it with our diet by looking on the shelves of a grocery and of a meat store and by glancing through your mother's cookbook. Can you work out any reasons why the range of our diet is so much greater? Does range of diet affect health?

9. Notice the kinds and qualities of clothing of the Iroquois (p. 39). Compare this situation with our situation by looking over the shelves of a clothing store and of a dry-goods store and by glancing through the catalog of some big mail-order house. Can you work out any reasons why

we have so many more forms of clothing, made of so many more kinds of material?

10. At your dinner to-day make a list of the things you have that the Iroquois did not have. Include both utensils and kinds of food. If some of your food is the same in kind as that of the Iroquois, how much of the preparation which the Iroquois squaw gave this food is now carried on in your home?

11. Are you quite sure you understand what is meant by the appropriative, adaptive, and creative periods of man's progress? If you have any doubt of it, read again pages 28 and 29, for you will need to use these terms.

12. When we were studying Neanderthal man, we said that no stories of how he lived had been handed down through the generations to us. Concerning the Iroquois, however, we tell what tradition says about the way they lived around Puget Sound and in the Mississippi Valley. How does it happen that traditions have not come down from Neanderthal man and that they have come down from the early Iroquois?

13. Think back over the way the Iroquois traded. Is trading done to-day in the same way? Is more trading done to-day?

14. In what ways was the long house like a modern apartment house? In what ways was it different?

15. In what ways was the Iroquois family like ours? In what ways was it different?

16. Think back over how the Iroquois tried to cure a sick person. Compare the medicines used with the number on the shelves of a modern drug store. How long do our doctors study before they try to cure people? Do you begin to see what we mean when we say that we use *science* to-day?

17. Make a list of the ways in which an Iroquois youth could learn about their laws, customs, and religion. What ways have you to-day?

18. Have we anything in our government that is at all like the League of the Iroquois? Anything that is at all like their great autumnal council?

19. Someone has said that one of the greatest services of science is that it has freed man from many foolish fears and has made him feel safe. Can you illustrate this by comparing us with the Iroquois, who had no science?

20. Answer the questions at the beginning of the chapter.

21. Read the purposes of Part I on page 3. Show that these purposes have been accomplished.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter II.

1. The Swiss Lake Dwellers (groups that came to live far better than Neanderthal man).
2. Woman's Share in Primitive Culture (early division of labor).
3. Some Great Advances of Neolithic Times (the domestication of animals and the use of agriculture).
4. The Oeh-da, the Good Spirit and the Bad Spirit (an Iroquois myth of the creation).

Longfellow: *The Song of Hiawatha.* The illustrated edition published by Houghton Mifflin Co.

See also in Marshall: *Readings in the Story of Human Progress.*

Chapter III, 1. How Early Man Tamed Fire (illustrations of early fire making).

Chapter VII, 1. Gesture Language (two complete stories told entirely by gestures.

Chapter VIII, 1. How Nature Affects Primitive Transportation (an example of the importance of nature in our living together).

Chapter XIV, 1. Some Early Forms of Social Control (myths, magic, fetishism, totemism, and taboo).

Problems to think over are given in these reading selections.

PART II

MAN, THE HARNESSER OF NATURE: MULTIPLICATION OF MAN'S POWERS

PURPOSES OF PART II

1. To show some of the more striking ways in which man has increased his powers by harnessing nature.
2. To show why scientific knowledge is such a great aid to man.
3. To show how important it is to be able to harness nature if we wish to live together well.

CHAPTER HEADINGS OF PART II

Neolithic man lived on the same earth as you and I, but he lived far more meagerly. One reason for his meager living was his lack of ability to make the best use of nature's powers.

Quite unaware of the sleeping giants beneath his feet, he hunted game over the same deposits of coal, petroleum, and iron ore that now give us our power-driven machines. With digging stick or tortoise-shell hoe he scratched the soil that is to-day turned by giant plows drawn by tractors. He put up his miserable shelters on the same spots where to-day we find a country mansion or the skyscrapers of New York or Chicago. He spent days on the same trails that are to-day covered in hours by the locomotive. The same nature that is to-day harnessed by science was, for neolithic man, filled with unknown "spirits" and "magic."

Evidently man has greatly multiplied his power over nature since the day of neolithic man.

In Chapters III, IV, V, and VI we are to see some of the main steps by which man has harnessed nature and made her do his bidding. In Chapter III, we shall see how he learned to command fire and the metals; in Chapter IV, how he has harnessed steam, gas, and electricity and put them to turning machines for him; in Chapter V, how he has developed scientific knowledge, that greatest of all harnessers, and has forced nature to tell some of her amazing secrets. These secrets turned out not to be magic at all! In Chapter VI we are to see what all this means, as far as living together well is concerned.

CHAPTER III

FIRE AND THE METALS AS PHASES OF MAN'S HARNESSING OF NATURE

A. MAN'S CONQUEST OF FIRE
B. MAN'S CONQUEST OF THE METALS

QUESTIONS TO KEEP IN MIND WHILE READING THIS CHAPTER

1. Just what does it mean for man to multiply his powers as compared with merely adding to them?
2. What have been the results of man's conquest of fire?
3. What have been the results of man's ability to command the metals?
4. How much better is it for man to be able to use science as his servant?

Man's progress is a story of his increasing powers. — Our account in Chapters I and II of man in early groups or societies shows that by the time of neolithic man our race had seven great powers or abilities.

Three of them were, so to speak, within man himself. The first was his *ability to stand erect*, which, of course, he had had for many thousands of years. This gave him a command over the use of the levers of his body (after all, our bones are levers of a sort). No other animal possessed this ability, and accordingly man had power to do things no other animal could do. The second was the fact that the thumb was so placed on his hand that he had *ability to use his hand as a grasping device.* This, few other animals are able to do, and none of them has the thumb as well placed as man. This ability counts for a great deal when it is a matter of making and using tools. It largely explains, too, the shapes and forms of man's tools. The third was his *power of*

thinking and planning, in which he greatly excels all other animals. This, as we have seen, was partly the result of his having developed the power of speech. Since speech and communication are to be discussed at length in Part III, we shall not spend more time upon them now.

Out of these three great abilities there grew four other abilities. They were, first, his *ability to make fire*, and we have seen that quite early he learned how to make fire at will; second, his *ability to make and use tools*, and we saw that even Neanderthal man had crude tools; third, his *ability to command animal life* through what we call the domestication of animals; and fourth, his *ability to command plant life* through what we call agriculture. The third and fourth stages had been reached by the time of neolithic man. As we go on with our study, we shall see that all of man's later progress rests on these seven great foundation stones.

Multiplication of powers vastly more important than mere additions. — There is a very interesting fact about the rate of man's progress. That rate has been most uneven and irregular. For long periods of time he would make very slow progress. Then something would happen or something would be discovered that would let him progress at a rapid rate for some time. This would be followed by another period of slow progress. And so on. We say that in the periods of slow progress man was merely *adding* to his powers, whereas in the times of rapid progress his powers were being *multiplied.*

For example, for many thousands of years man's powers or abilities as a food-getter were weak, and they developed quite slowly. In the main he appropriated what nature, of her own accord, gave him. When he learned to till the soil and to raise foodstuffs, it meant a great increase in his power to live well. It *multiplied* his ability to get food. But after

he had once learned to raise a few plants, additions to his list of plants were mere additions to his powers rather than multipliers of them. So also when man learned to domesticate animals, it greatly increased his power to live well. These domesticated animals gave him a regular food supply, and many of them were important to him as burden carriers. But once man had learned the trick of domesticating animals, any new animals added to his list were mere additions. As we go on in our study, we must notice what things have been multiplications of man's powers and what things have been mere additions. The multipliers are far more important.

We begin with a study of man's work as a harnesser of nature.

A. Man's Conquest of Fire

(How the fire-making and fire-using abilities of neolithic man have been multiplied.)

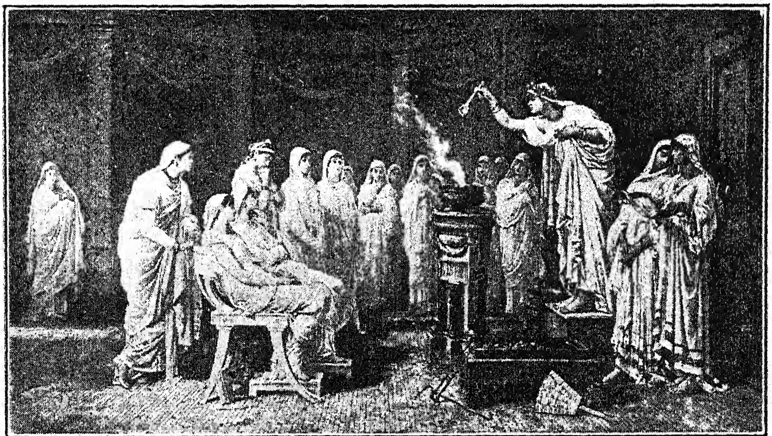
Fire is one of the great multipliers of man's powers. — Anyone will quickly become convinced that fire is a multiplier of man's powers if he thinks of the ways fire has acted upon scores of things he uses every day. It would take dozens of pages to make a complete list of these ways, but here are some samples. Fire is necessary to make all of the bricks, tiles, plaster, and metals that we use. It furnishes the heat that runs the engines for sawing the wood for our houses and for making our clothing and household furnishings. Glass and pottery cannot be made without it. Houses are heated by it. Electric lights are but one of its forms. It enables us to run our railroads, our street-car systems, and our automobiles. It cooks our food. We use it to increase the usefulness of almost everything we can think of. It is truly a multiplier of our powers.

The first steps in man's harnessing of fire were taken in the dim past. — Man was a user or an appropriator of fire long before he could kindle or create it.

"Natural" fire. — In that far, dim past when he did not know how to kindle a fire, he used fires that nature kindled just as she does to-day. In some parts of the world there are volcanoes whose overflowing lava starts fires in woods and other uncleared land. Cases have been known where earthquakes have dislodged stones, which have crashed down a mountain side and have made sparks that set the grasses on fire. Lightning frequently kindles some tree that it strikes and might even kindle vents of natural gas in certain parts of the world. Then, too, cases of what we call spontaneous combustion occur. This has occurred in coal mines by water seeping in and setting up a chemical action which resulted in fire. We have had stories, too, of such fires being started in masses of decaying vegetables or animals. It is said, for example, that fire has been started by the decaying of a whale cast up on the shore. Dry trees sawing against one another in a high wind have started fires. These are samples of ways in which nature kindles fires.

Fire keeping. — No doubt man at first just used these fires of nature where he found them. Gradually, through thousands of years, he learned to carry "natural fire" to places where he needed it and to "keep" it by carefully feeding it fuel, and by "covering" it with ashes. Among these primitive peoples, the duty of keeping the fire was a most important one. It does not surprise us in the least to learn that among many peoples the careful keeping of the fire grew to be part of their religion, and continued to be so even after they had learned how to make fires themselves. Such a religion of course came down to them from the earlier days when the death of the fire was nothing short of a calamity for the group.

Fire making. — Fortunately for man, he learned how to *make* this great multiplier, fire, at a very early stage. We know that Neanderthal man had fire, and some scholars believe that he could make his fire by striking iron pyrites together and letting the resulting sparks fall on dry tinder (see page 18). We know that neolithic man had learned to make fire by whirling one dry stick upon another (see page 35).



From Guerber: Myths of Greece and Rome (American Book Co.)

FIRE KEEPING AMONG THE ROMANS

Fire keeping became a religious custom. In the temple of Vesta, young girls kept the sacred fire burning day and night. A great many peoples have had religious rites in connection with fire keeping.

We are quite certain, then, that man has known how to make fire for many thousands of years.

Your great-grandfather saw the next multiplication of man's fire-making ability. — And now we come to a most interesting fact. Neolithic man knew how to make fire by rubbing sticks together, and by the "strike-a-light" method of the pyrites; and man since then has kept on making fire by such simple methods until very recently. For thousands and thousands of years there was almost no change except

some improvements of the tools. He learned to use the flint and steel instead of pyrites, but there was no multiplication of his fire-making ability until the match was invented.

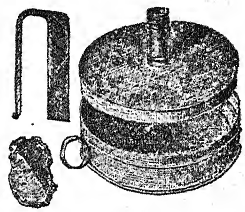
When we want a fire to-day, we make it without any trouble at all by using a match. We never stop to think that the match is one of the most wonderful things in the world and that it was many thousands of years before firemakers learned to use one. It was not, indeed, until after the time of George Washington that men learned to make fire by matches. In 1805, a chemist in Vienna invented an outfit for fire making which consisted of a bottle of sulphuric acid into which one dipped wooden splints tipped with a mixture of sulphur, chlorate of potash, and sugar. These matches cost about five cents each and were very unsatisfactory. They might or might not catch when dipped in the acid, and frequently they would smolder and sputter, throwing the acid about and spoiling both the temper and the clothes of the firemaker.

It was not until 1827 that an English chemist, John Walker by name, tipped a splint with chemicals that would burst into flame when rubbed on sandpaper, and thus made the first *friction match.* A few years later, in 1833, by the use of phosphorus in the chemicals, a match was invented that could be lighted without the need of carrying sandpaper around. We then had the *phosphorus match.* Nowadays a hundred matches can be bought for a cent and we use in the United States, so it is said, over one hundred and fifty billion matches a year. This means that each man, woman, and child uses, on the average, four or five matches a day. Just think what this means in ability to command fire at almost any time or place! Fire is now a servant at our beck and call.

We should remember that man became able thus to command fire because he had developed the science of chemistry.

His knowledge of chemistry enabled him to harness the forces of nature in such a way that he could make the friction match. All this was such a short time ago that there are people still living who remember when flint and steel and tinder box were used in almost every household.

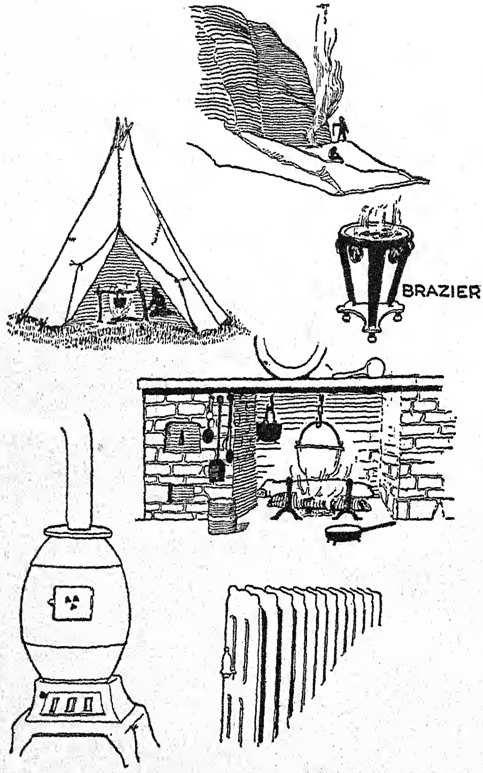
Even more recently we have harnessed electricity to make heat for us. We use it in great furnaces or retorts in industry, and it is rapidly coming into use in our households for cooking and other purposes. Probably there are few of us who have not seen and used an electric iron. An Iroquois would never have believed that Heno, the Thunderer, would one day be harnessed to make steel, or to iron a handkerchief. But then, an Iroquois was only in the appropriative and adaptive stages of progress. The creative stage was still to come.


TINDER BOX, FLINT, AND STEEL

Man's use of fire in keeping warm.— We shall talk a great deal of the use of fire in modern industry when we discuss the making of iron and steel, the development of transportation, and the providing of power to run machines. Let us at this time see something of how we have used heat as a means of keeping ourselves warm.

The open fire. — The first use of fire for this purpose was seen when quite primitive man kept his fire just outside the crude shelter in which he lived. Of course, most of the heat went to waste in any such scheme. Later he built his fire inside his cave, or hut, or wigwam, or long house, or whatever other shelter he used. In some parts of the world where the weather never grows very cold, houses are still heated by open braziers, which are carried from room to room as they are needed. The fumes are not pleasant or healthful.

Probably a long time went by before man became wise enough to cut a hole in the roof to let the smoke of his fires out; and no doubt thousands of years went by before he learned to put a couple of poles up by that hole and make a skin windbreak that would cause the smoke to be sucked out more effectively. We are so accustomed to chimneys that we can hardly realize that there were few chimneys in England before about 1200 A.D. And, of course, a chimney is not merely a great convenience in carrying out the smoke. It also creates a draft and makes the fire burn better.



THE DEVELOPMENT OF HEATING DEVICES

Grates, stoves, and furnaces. — Once the chimney had come into use, houses could be heated by means of the familiar open grate. This also is wasteful of fuel, since eighty-five or ninety per cent of the heat goes up the chimney. A stove invented by our own Benjamin Franklin in 1744 was a great step forward. This stove stood out in the room and radiated

heat all around. Although there were stoves earlier, Franklin's invention brought them into general use and thus enabled people to get from forty to sixty per cent of the heat out into the room. Franklin also made the first attempt at a hot-air furnace. This method began to have general use early in the nineteenth century. So also did the modern hot-water furnace, although we read of the occasional use of hot water to heat houses in ancient Rome.

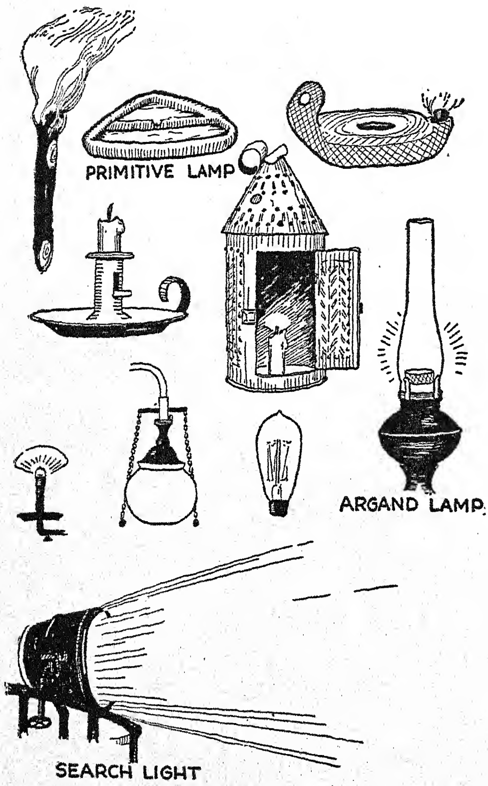
As we think back over this story of the use of fire for warming ourselves, we are again struck by the fact that for thousands of years progress was quite slow, and that our modern methods are very new. Man is just beginning to have a chance to live well.

Man's use of fire for light. — *Primitive lighting.* — The fire of primitive man was, of course, also his light. As time went on, he learned that certain kinds of wood burned more brightly than others, and from these he made rude torches. Then, too, fats when thrown on the fire must very early have given him a hint that they could be used for light. He gradually learned to use a hollowed-out piece of soapstone, or a clay vessel, to hold the oil or fat, and a sort of rude wick. This was the first lamp.

It is hard to believe, but for thousands and thousands of years man's progress in light making was merely a story of additions. This primitive lamp gradually assumed more pleasing shapes; it became a closed vessel with the wick sticking out of a hole in it; it was gradually shaped so that it had several wicks; candles were made (an early form was the candle fish, which was so full of grease that when a wick was thrust in it, it served as a candle); lamps were later incased in glass (these were not chimneys) to protect them from the wind. But after all has been said, it was not until about 1800 that man got a better light than the flickering,

smoking, and too frequently foul-smelling light of torches, grease lamps, and candles.

The wonderful lamp chimney! — This improvement also was connected with the development of the science of chemistry. About 1784 a Swiss chemist, Argand, discovered that he could have a circular wick instead of a flat wick and could arrange to have a draft of air alongside the flame. The oxygen in the air caused a brighter flame with much less smoke. Quite by accident Argand's younger brother broke a bottle over one of these flames in such a way that it acted as a chimney, and he noticed that the flame was very much better. This was the first glass chimney, and it multiplied the lighting power of the lamp. Think what this meant to those who would read or work by night!



THE DEVELOPMENT OF LIGHTING DEVICES

New fuels. — Improvements in the fuel used for lighting are also quite recent. Animal fats and whale oil were the

usual fuels until within the last one hundred years, although even the ancients knew of natural gas and knew that it burned with a fairly bright flame. People did not learn how to manufacture gas from coal until in the eighteenth century. In 1739 an Englishman by the name of Clayton described how gas could be produced from coal by heating the coal in a closed vessel, or retort, but it was not until 1792 that one Murdock lighted his house and office by gas. In the period from 1810 to 1830 gas began to come into use for lighting streets, supplanting the old whale-oil lights. This, you will notice, was only a hundred years ago, and in the older streets of both this country and England there still are houses with devices on the railings with which to extinguish the torches used in lighting guests to carriages. Kerosène did not become available until about 1850.

Electricity. — Of course, electric lighting is still more recent than lighting by gas. It was not until 1862 that an electric arc lamp was put into regular service. There were only two exhibits of electric lighting — and they were regarded as great curiosities — at the Centennial Exposition, which was held at Philadelphia in 1876. Edison first exhibited his incandescent lamp at his laboratory in Menlo Park, New Jersey, in 1879. It was not until 1882 that the first central power station for making electricity was constructed.

We are so accustomed to stepping outside the house at night into a street lighted by electricity that it is hard for us to understand how recently man has harnessed this natural force. We need to remember that people are still living who walked on streets that must have looked very much as our streets look on those rare nights when something has gone wrong at the power plant and the town is almost in darkness. And as for our ability to press a button and have a flood of light in our home, or to strike a match and light the gas, or,

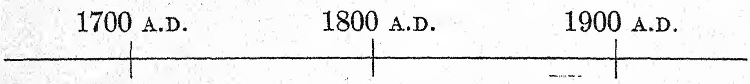
for that matter, to strike a match and light a kerosene lamp, these things are events in the lifetime of our own father or grandfather.

A chart shows the newness of our control over fire and light. — As a means of seeing how very recent our present ability to command fire and light is, let us go back to the chart we made in Chapter I. The chart in that chapter (see page 6) was one covering the length of time man has been a good communicating animal. If we were to try to locate on that chart the more important multiplications of man's heating and lighting power, we should find them all crowded at the extreme right end of the line. Indeed, they would be so crowded together that they would not show well on the chart.

Let us, then, make another chart showing only the last few centuries of man's progress in fire making, and let us remember that even these few centuries will take in the more important happenings since the time of neolithic man.

Make on the sheet of note paper you are using for your charts this heading:

SIX HUNDRED YEARS OF MAN'S HARNESSING OF FIRE AND LIGHT

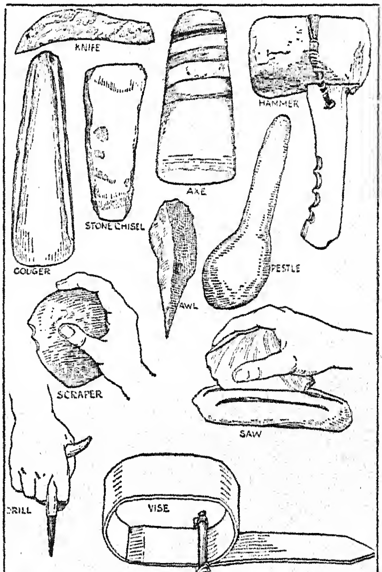


Place the date 1900 over at the right side of the paper and draw a line out to the left, letting each one hundred years be represented by a space one and one-fourth inches long. Then every one eighth of an inch will stand for ten years. Carry the line back to 1300 A.D. Locate on this line the more important devices that man has developed in the field of heating and lighting as far as we have discussed the matter. Do you find that they are very recent?

B. Man's Conquest of the Metals

(How the metals have multiplied our powers: how we have secured plentiful iron and steel.)

The multiplier, fire, has given man another great multiplier, the metals; for fire has enabled man to take certain kinds of stones or rocks called ore and melt out useful metals. It is true that small amounts of a few metals, such as gold and copper, are occasionally found free from the ore. However, so little metal can be obtained in this free state that it is fair to think of fire as the great metal-giver of man.

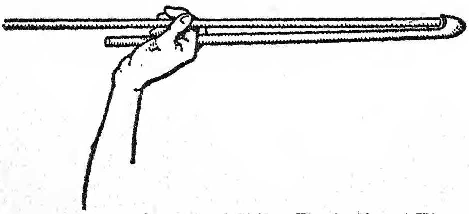


THE TOOL CHEST OF NEOLITHIC MAN.

How metals multiplied the powers of early man. — We can see how the metals multiplied the powers of early man by studying their effects upon his tools.

Neolithic man had many tools. — If we think back over the account of neolithic man, as illustrated by the Iroquois, we remember that he had a really surprising collection of tools. He had simple and rude samples of all the important tools we use to-day. Of what we call *cutting tools,* he had knives and gougers, which he worked by pressure; axes and stone chisels, which he worked by blows or shock; and saws made of flints with rough edges, or of sharks' teeth or other pointed teeth set

in wood. Of what we call *smoothing tools* he had scrapers, smoothers, polishers, and grindstones. You will remember how the Iroquois women scraped the deer skins which they were curing, and how the bows and arrows were smoothed and polished. Of what we call *fracturing, crushing,* and *grinding tools,* he had hammers, pestles, and grinding apparatus such as those he used in grinding grain. Of what we call *perforating tools* he had needles, prickers, awls, punches, and drills of various sorts. We have seen uses he made of all of these perforating tools with the possible exception of his drills. We know of his drills, however, for the same tools that were whirled to make fire were pointed with a bone or thorn and whirled to make a hole. Of what we call *grasping or joining tools,* he had tongs, crude vises, lashings, and glues. Altogether he had quite an assortment of tools.



Courtesy of Wells: The Outline of History

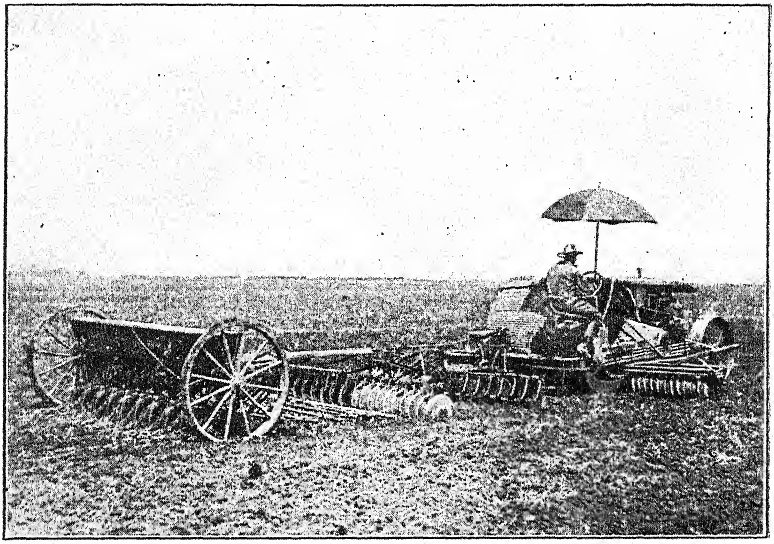
A THROWING-STICK

This shows the Australian natives' method of using a throwing-stick or spear-thrower. The throwing-stick was really a sort of lever enabling them to hurl the spear greater distances.

Defects in his tools. — These tools of neolithic man had two great defects. One was that he did not know how to apply much power to them. It is true that he had learned to "haft" them, or put handles on them. It is true, also, that in such devices as the throwing-stick or the bow and arrow, he had the beginnings of what we call to-day the use of power. But he had the merest beginnings.

The other defect of primitive tools was that they were made of very unsatisfactory material. Most of them were of stone, though sometimes wood was used, as were also bone,

horn, and even ivory in places where ivory could be secured. Now, all these materials are quite brittle and very likely to break when put to hard use. Imagine the difficulties you would have if all your knives, chisels, scissors, needles, and hammers, were made of such materials. You would surely



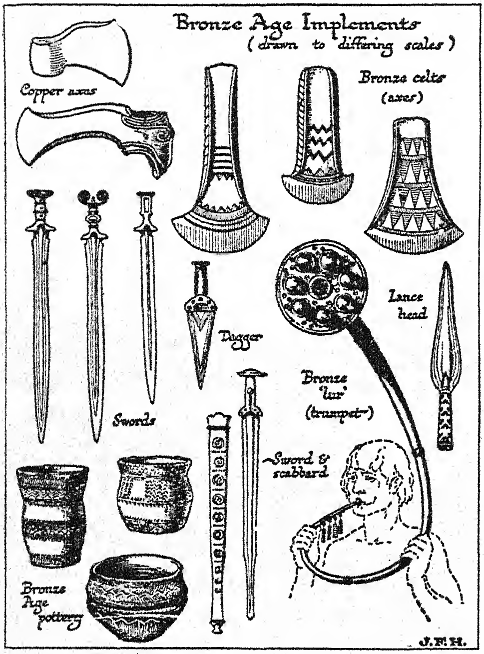
MODERN AGRICULTURAL MACHINERY

This man is plowing, harrowing, pulverizing, and seeding in one operation. Neolithic man, lacking metals, could not make such giant machinery. He could not command nature as well as we do to-day in agriculture. See page 33 for a picture of his agricultural tools.

feel that you had very unsatisfactory tools. You would surely feel that metal tools would be much better and would greatly multiply your powers.

Metals, especially the alloy bronze, removed one defect. — Nobody knows when metals first began to be used, but even before this communicating animal, man, had learned to write, he had learned to use metals. Nobody knows what tribe or race of man used metals first; nobody knows what

the first metals to be used were. Probably, different metals were used first by different peoples, depending, of course, upon the metals with which nature had provided their particular territory. Some writers think that the very first metals to be used by man were copper and gold, because these metals are found in many places free from ore and their glitter would attract the attention of primitive man. If this is true, primitive man may have thought of them as very interesting kinds of stone which he could appropriate and adapt into useful and pleasing shapes.



Courtesy of Wells: The Outline of History

A Few Bronze Instruments

These bronze-age peoples could live much better than neolithic peoples because they had metal sickles, awls, fish-hooks, knives, saws, spoons, and the like. Compare this picture with the one on page 22.

As time went on, certain peoples who lived where there were both copper and tin made the discovery, very likely by accident, that when these metals were melted together in a fire, the result was a new metal, bronze, which was for many purposes very much better than either the copper or the tin. This bronze is a so-called alloy. Alloys are very interesting. They are quite likely to have

qualities not possessed by either of the parent metals. This is true in the case of bronze. It is harder than either tin or copper, can more readily be cast into satisfactory form, and can be given a better and more durable cutting edge.

The discovery of bronze multiplied man's powers. All his older and unsatisfactory stone or bone tools could now be made of bronze. These metal tools gave him greater command over nature in his tree-cutting, boat-making, and soil-digging. Once this multiplication of powers had taken place there came next the slow process of addition, and man's tools steadily grew more numerous and better.

All other metals have yielded to iron. — But copper and tin are, after all, not very plentiful. In parts of the earth neither exists; in most parts of the earth they do not exist together and they must be together before bronze can be made. The one metal that can be found in almost every part of the world, although usually in the form of ore, is iron.

It is not surprising that it took man a long time to learn of iron. The ore in which it is found does not look very different from any other stone, so far as a savage can tell. Quite likely early man found a few pieces of iron in the "free" state. But it must have been by some accident that man first learned to make it. It may be that iron metal was first seen in the embers of some camp fire as a result of a chunk of ore being placed in the fire. There may be truth in the old tradition that in one part of the world iron was discovered as the result of a great forest fire which burned over an area in which there was iron ore. No one to-day can be sure when, where, or how iron was first made. We only know that man has had it a very long time, and that there were some parts of the world in which he had it before he had bronze. Suppose we say that he has had iron about as long as he has been able to write.

Primitive methods of iron making have continued down to the last four hundred years. — Although we do not know when, where, or how iron was first made, we do know the main steps that man took in mastering this metal, which is now the most important single commodity he uses, with the exception of air and water.

Courtesy of Ratzel: History of Mankind

PRIMITIVE IRON FORGING

One of these savages is working a crude bellows; the other is ready to drop small lumps of charcoal and iron ore into the fire (which has not yet been built) and to hammer the iron with stone tools. By working hard they can produce ten pounds of iron in a day. Compare this picture with the ones on page 91 and page 93.

Early iron production. — As you would expect, his first steps in mastering iron were very feeble ones. We can see something of what they must have been by noticing how, within the memory of living man, savage people in Africa made iron. It is a fair guess that man of long ago made iron in something the same way. The picture shows two naked savages squatting on opposite sides of a primitive forge. One of them is working a crude bellows which sends a blast of air

through an underground tube to the place where the fire for reducing the ore is to be built. The other savage is ready to keep dropping small lumps of iron ore and charcoal into the blaze. These two savages, working, pumping, sweating all day long might have at the end of the day a lump of iron which would weigh as much as ten pounds. You can see that they are ready to hammer this iron with stone tools. By hammering, reheating, and hammering again and again they could get most of the impurities out and have very good iron.

Courtesy of Smith: The Story of Iron and Steel, (D. Appleton and Co.)

THE CATALAN FORGE

Compare this picture with the early savage forge shown on page 90 and with the modern blast furnace shown on page 94.

The Catalan forge.—Astonishing as it may seem, this primitive way of making iron, with only some additions, continued to be the way that iron was made down to about the time of the discovery of America by Christopher Columbus. We can neglect these minor additions and come at once to the Catalan forge, so called because it was developed at Catalonia, Spain. This was the best device for making iron that man had until about four hundred years ago. Such furnaces have, indeed, been used in our own country within the memory of your grandfather.

Above is a picture of the Catalan forge. At the bottom of the chamber was put charcoal; the fire was started and blown by

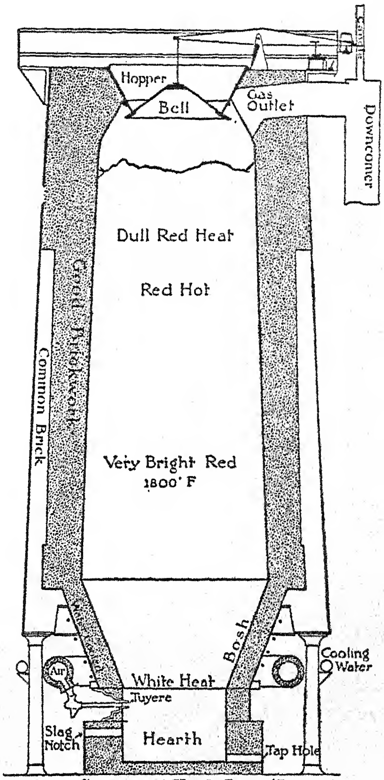
a current of air from the bellows. Above the fire were piled alternate layers of iron ore and charcoal. As the charcoal burned away and as the iron ore shrank in size in the process of forming iron, more ore and charcoal were placed on the top of the heap or "charge," and this was continued for hour after hour.

When the blaze was stopped, there was found in the bottom of the furnace a ball or spongy mass of iron (it was called a bloom and the furnace was called a bloomery), still mixed with various impurities. This spongy mass was taken out and hammered and reheated and hammered and reheated and hammered again and again until most of the impurities had been removed. The result was a very good quality of metal, as good, indeed, as we are able to make to-day. Such a furnace, wasteful as it was, could in a day's time do the work of two hundred of the sweating savages shown in the picture on page 90. Man had made that much progress in his mastery of iron.

Iron scarce in those days. — But such methods did not make it possible to produce very large quantities of iron. It has been estimated that in the year 1500 the amount of iron made by the whole world was so small that if it had been divided up evenly among the inhabitants of the world a tablespoon or, at the largest, a teacup would have been an appropriate measuring device. Since iron was so scarce, it was expensive and had to be used very carefully. We can get some idea how precious it was from an account of the way they used it in medieval England. It was sold by the "piece," each piece weighing only about four pounds. A little faggot of these bars would be carefully treasured in each manor, and handed out bit by bit to make such things as plowshares, nails, and horseshoes. No one would think of being so extravagant as to use iron to make teeth for harrows, or to put tires on

wheels. It had to be saved for more important uses.

The blast furnace and appropriate fuel enormously increased our command over iron. — The next great surge forward in man's mastery of iron was what we call the blast furnace. This blast furnace is just an improvement of the old Catalan forge, but it is such a great improvement as to be a multiplier of man's powers. As men went on using the Catalan forge, they found ways to make the air blast much stronger. They could, accordingly, make the height of the furnace greater and still force the blast of air up through the charge. The higher furnace and the better blast of air made possible a very much hotter fire. This hot fire melted the iron which was in the ore to a *liquid* (the old Catalan forge was not able to do this) and this liquid would trickle down to the bottom of the furnace.

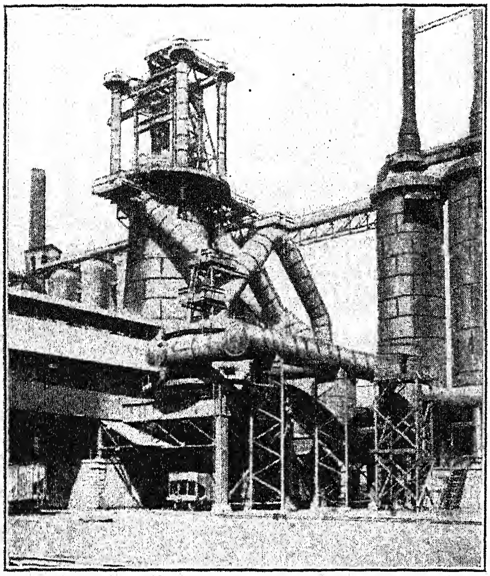


Courtesy of Hood: Iron, (Isaac Pitman and Sons)

DIAGRAM OF A BLAST FURNACE

To-day such a blast furnace may be one hundred feet high. At the bottom are the tap holes for the iron and for the slag. Just above the slag hole is the *tuyère* where the blast of hot air (we now heat the air used in the blast) is thrown into the furnace. The "charge" of limestone, ore, and coke, which is to-day used instead of charcoal, is at white heat down near the bottom, red heat a little higher up, a dull red heat near the top. A great volume of hot gas fumes pours out the gas outlet at the top. These gases are made use of as a by-product. The charge is thrown in at the top through an adjustable hopper and bell. The bell closes the opening after the charge has been put in.

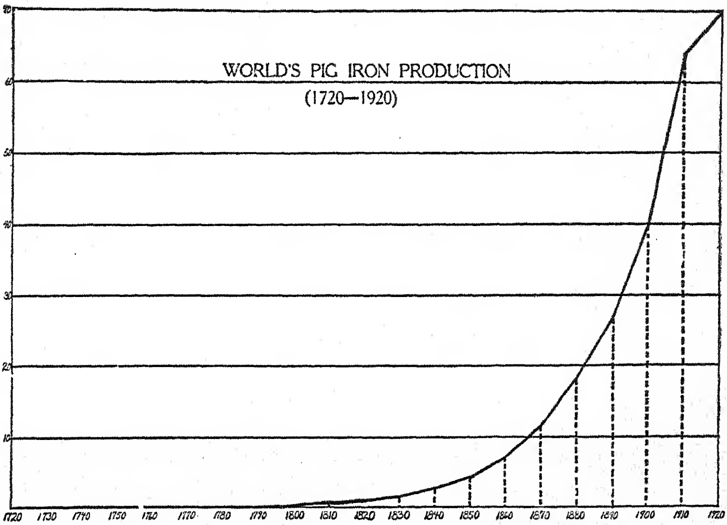
They found, too, that by mixing limestone with the charcoal and iron ore, many of the impurities of the ore would, in the fierce heat, combine with the limestone and also flow to the bottom of the furnace as another liquid. The liquid iron was heavier than the liquid impurities or "slag," so that there would be two layers of liquid at the bottom of the furnace. From time to time, the upper layer, slag, could be drawn off through an opening. The liquid iron could be drawn off through a lower opening. Since the iron and the slag could both be drawn off without stopping operations, men could keep on reducing the ore day after day, and week after week. As fast as the limestone and charcoal and iron ore turned to iron and slag, added material could be thrown into the top of the furnace without stopping the work at all.



A MODERN BLAST FURNACE

It is said that the first blast furnace was made in Belgium about 1340, but this new device was not used very widely until about 1550. For that matter, not until man had learned to use anthracite coal and coke, in about 1750, did the blast furnace really come into its own. Anthracite coal and coke (coke is made of soft coal) are both firm enough to bear the

weight of great masses of iron ore and limestone without mashing down. This makes it possible to use great furnaces 80 to 100 feet high and still force the air up through the charge. Such a blast furnace will turn out as much iron as could be made by 200,000 of the toiling savages shown on page 90.



THE WORLD'S PIG IRON PRODUCTION, 1720–1920

The top line stands for 70,000,000 tons of pig iron. The amount made annually before 1800 hardly shows on the chart. It is clear enough that the large output of iron is a matter of the last seventy-five years.

As a result iron is plentiful.—The chart shows that it is only since man has learned to use the anthracite or coke blast furnace that he has become an enormous producer of iron. Indeed, it is only in the last hundred years that the amount of iron produced each year makes much of a showing on the chart. The same facts may be told another way. If all the iron made in the world in 1500 were put in a wall eight feet wide and six feet high, the wall would reach for seven

city blocks. If the iron that is made in a single year to-day were put in a wall of the same size, that wall would reach from Chicago to New York and three hundred miles out into the ocean. If we let the heavy black line shown below represent the amount of iron made in a single year to-day, the little speck at the lower left represents the amount made in 1500. Iron does not need to be doled out to-day in little four-pound bars! We use it lavishly, and its lavish use is one of the reasons why we are able to live better and more comfortably. Just take a look around and see the quantities of metal (mostly iron) which we use to-day! What kind of life would we be living if we had to do without it?

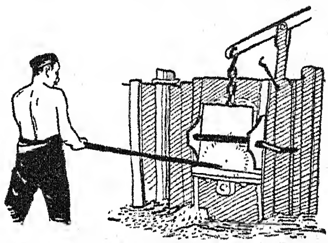
THE WORLD'S PRODUCTION OF IRON IN 1920 AND 1500

The big line shows the iron produced in 1920. The little speck at the lower left shows how much was produced in 1500. As was shown in the preceding chart, the great increase in production is quite recent.

Man uses chemistry to make steel cheaply. — Even yet the full story of man's control of his servant, iron, has not been told. Useful as iron is, steel is much better, for with the same weight, steel has much greater strength and hardness. Now, ordinary steel is just iron with a small and proper percentage of carbon in it. Once man had learned to make iron cheaply and in great quantities, the next problem was to free this iron from its impurities and then be able to mix with it just the right amount of carbon or other material to make the kind of steel desired.

Early steel making. — As we have seen, the earliest steelmakers burned and hammered the impurities out of the iron; they mixed carbon with it by heating it with charcoal, which is mainly carbon. Some of these early steelmakers became

very skillful, and made as good steel as we make to-day. The trouble was that they did not know chemistry and did not know how to *measure* the different elements as does the chemist to-day. In consequence, only a few highly skilled and intelligent people developed the "knack" of making good steel. They "judged" when conditions were just right. But when chemical knowledge became available, man no longer needed to rely on guesswork or judgment. The chemist is able to measure accurately. Furthermore, in addition to giving us exact measurement instead of "judgment," he is able to tell us many new ways of removing impurities.



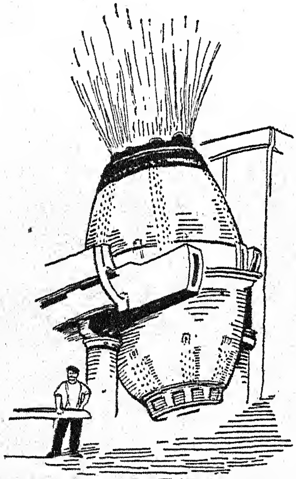
PUDDLING

Let us see some of the more important steps by which man has become able to make good steel in great quantities.

Cort's puddling process. — The liquid iron that flows from the blast furnace has many impurities in it. A great step in purifying this iron was taken when Cort invented in 1784 his puddling and rolling process. He built a huge furnace, the bed of which was made of certain material that would act in a chemical way on the liquid iron poured into it. After the liquid iron had been poured in, he caused an intensely hot flame to pass over its surface while it was being continuously stirred or puddled by a workman. Gradually, as a result of the chemical action of the bed and of the flames, most of the impurities either burned out of the iron, or trickled off as slag. The result was a spongy mass. Cort then took this from the furnace and ran it backward and forward between enormous grooved rollers that squeezed still further impurities out of the metal. This is quite like what the black savages did when they reheated and hammered

and reheated and hammered the spongy metal. The difference is that in Cort's day man had large furnaces and machinery to do the work for him and had learned to call chemistry to his aid. This is, of course, a very great difference. It means that iron can be purified much more cheaply. After it is purified, carbon can be introduced and then we have steel.

The Bessemer process. — The next great step was taken when Kelly in America and Bessemer in England invented (1846 to 1858) a device for removing impurities from the liquid iron in from ten to twenty minutes, as compared with the hours needed for the Cort process. The Bessemer process sounds so simple that it may seem surprising that it was not discovered sooner, but, after all, we learn very slowly. All that Bessemer did (and even this had been done by Kelly earlier) was to put the liquid iron into an enormous vessel, the sides and bottom of which were lined with the right kind of chemical material, and then to force small streams of air up through the molten mass. The oxygen in the air greatly increased the temperature of the liquid metal and burned out the impurities. The great flame coming from the top of the vessel (with its colors changing as the various impurities disappear and so cease to color the flame) is a wonderful sight.


BESSEMER CONVERTER

The open-hearth process. — About the same time, 1856 to be exact, a man by the name of Siemens found still another way to remove the impurities from the liquid iron. He developed what is called the open-hearth process for making

steel. This process is not greatly different from the principle used by Cort in his furnace. The hot liquid metal is placed in a furnace and an intensely hot flame, much hotter than could be developed in Cort's time, plays over the liquid metal. This flame, together with chemical action caused by materials in the bed of the furnace, slowly removes the impurities without the necessity of using the puddling process of Cort.

The end sought in all these modern processes is that of getting the iron in a fairly pure condition. Once this end has been gained, it is, of course, possible to introduce carbon or other materials in such quantities as may be desired, and then we have steel. The work is done according to rules carefully worked out by chemists. This precisely controlled, *scientific* making of steel is a far cry from the steel making of our two naked Africans.

Electricity and alloys. — To-day the making of steel is in a new stage. For one thing, electricity is now being used as the heating device. This makes possible a far more intense heat and at the same time gives a far more delicate control of the heat than we have ever had before. The result is an even finer product. For another thing, we have carried our knowledge of chemistry to the point where it enables us to make wonderful steel alloys, such as manganese steel, chrome, tungsten steel, and nickel steel. We should expect these alloys to be wonderful things because, as we saw in the case of bronze, (page 88) an alloy is likely to have properties and powers not possessed by the parent metals. Nickel steel will serve to illustrate them all. The combination of nickel and steel gives us a metal that is exceedingly hard and that at the same time does not crack easily. For this reason it serves admirably as armor on our war vessels, as shafting on our machinery, and in general as good material for all uses which demand great power of resistance.

Cheap iron and steel have meant a different world to live in. — All these great improvements in making iron and steel have made them so much cheaper that we no longer have to be economical in using them. The result is that we make such great use of steel that many writers call this the "age of steel." The name is a good one, for steel to-day enters into almost everything we do.[1]

The age of power. — For one thing, this age of steel has made possible an age of power. When one thinks of our power makers to-day, he thinks of steel grates, steel boilers, steel cylinders, steel pistons, steel driving shafts in our engines. He thinks of dynamos, tractors, automobiles, and cranes, and these are all made mainly of steel. We could not have harnessed power if we had not first harnessed steel.

The age of machines. — For another thing, this age of steel has made possible our age of machines. As long as man had to depend upon wood or even upon iron to make his machines, these machines would not stand much strain. They were too weak for the driving powers man had harnessed. But when this giant, steel, was harnessed, we had material out of which we could make our modern agricultural machinery, our printing presses, our textile machinery, our shoe-making machinery, our war machinery, and all the other clattering servants which man drives to do his will. This machinery gives us goods of better quality and greater quantity than we could have had without it.

The age of transport. — Then, too, this age of steel has made possible an age of transport. As long as we could use merely wood or iron, rails could not be made which would carry heavy loads; bridges could not be built which would

[1] The next few paragraphs are freely adapted by permission from Lesson C-10, *Lessons in Community and National Life*. Acknowledgment is also made to Swank: *Iron and Steel in All Ages*. (American Iron and Steel Ass'n.)

meet the strain of heavy traffic; wheels could not be made to carry heavy burdens. With an abundance of steel all this was changed. Steel rails, steel bridges, steel wheels, steel locomotives, and steel sheets made possible the use of steel freight cars, steel passenger coaches, and steel ships. The result has been an ability to carry goods cheaply in great quantities. We may thank steel for the fact that the total cost involved in moving the hide to the tannery, the leather to the shoe manufacturer, and the shoe to the consumer is only a few cents per pair. And similar statements could be made of most of the goods we use to-day.

Our dependence upon iron. — Even this does not tell the full story of the effects of the age of steel upon our living together. Its furnaces, its steel beams, its stoves, its piping, have made our homes very different from what they would be without its presence. Its use in our hospitals, in our water works, in our sewers, and even in our medicines (for iron is one of our most important medicines) has meant a great deal in the realm of health. Its automobiles, its Ferris wheels, its roller coasters, its moving-picture machines, its playground apparatus, its phonographs, have a great part in our recreation. The way iron serves us in our food getting is typical. Our bread and meats are borne to us over the iron way from the grain fields and pastures of the West. The iron horse brings us oranges from Florida and California; the iron ship brings us bananas from the Caribbean Sea. Iron machines prepare our canned foods. The cans are made by machines; they are filled by machines, sealed by machines, soldered by machines — everywhere machines; everywhere iron and steel.

Our dependence upon iron is so great that if we were suddenly deprived of it we would drop back almost to the living conditions of Jacob and Esau. Food would no longer be

easy to get, nor coal, nor wood, nor wool, nor cotton. Famine would wipe out hordes of us as an eraser removes chalk marks from the blackboard, and where 100,000,000 persons are now there could exist not more than 5,000,000. And all that has been said on the last two pages is but the merest beginning of a catalogue of the ways in which cheap iron and steel have made this a different world to live in.

Abundance of iron and steel is recent. — Let us now review our discussion of man's mastery of metals, as illustrated by iron, in such a way as again to make it clear to us how recently man has become able to live well. On page 84 we had a chart showing six hundred years of man's harnessing of fire and light. Let us now make a similar chart, giving it this heading:

Six Hundred Years of Man's Harnessing of Iron

As we insert on this chart the important events in the harnessing of iron and steel, it will become very clear that we have only recently secured our large command over metals. Such a thought makes us wonder what the future has in store for us. Man is just beginning to have a chance to live well.

Problems

1. Define or explain

Multiplication of powers	Alloys
Chemistry	Catalan forge
The flint and steel	Coke
Bessemer process	Slag
Open-hearth process	Argand burner

2. What things can you mention that man is better able to do because of his ability to stand erect? Have you ever seen animals "rear up" so as to free their front legs for action?

3. What things can you mention that man is better able to do because of his "free" thumb? Can you name any other animals that make

similar uses of their forefeet? If you can, are they as skillful as man at it?

4. Name as many things as you can that show man's power to live well was greatly increased when he learned to command plant life through agriculture. Did it mean more food? Better food? More dependable food? Does it mean the same things to-day as far as food is concerned? Does it mean anything today as regards clothing? Shelter?

5. Show in detail that man's power to live well was greatly increased when he learned to command animal life through domestication of animals.

6. One writer says that man has not added any new member to his list of domestic animals in the last 5000 years. Do you know whether he has done much in that period by way of making improvements in the animals he had already domesticated? Why do we teach "animal husbandry" at our agricultural schools to-day? Is man harnessing nature when he improves the breed of his animals?

7. Can you name a single thing you have used to-day that has not been to some extent affected by man's use of fire? Do you suppose that in your high-school and college work there will be much studying of heat and its consequences?

8. Explain why early peoples should think it so important to have good fire keepers that they made fire keeping the special duty of certain members of the group.

9. Draw up a list of reasons why the match is better than the flint and steel. Just how did the chemist harness nature when he gave us the match?

10. Think back over the history of man's use of fire. Point out an appropriative stage; an adaptive stage; a creative stage. In which stage has man greatest command over fire?

11. Think back over the history of man's use of fire. What events are so important that it is fair to call them "multipliers"? Is the harnessing of electricity important enough to be so called?

12. Think back over the history of man's use of light. What "multipliers" can you mention? Did science give us any of them?

13. Can you name a single thing you have used to-day that has not been to some extent affected by man's use of metals? Do you suppose that in your high-school and college work there will be much studying of metals and their consequences?

14. Think back over the history of man's use of iron. What events are so important that it is fair to call them "multipliers"? Was the discovery of how to make coke as important as that? Was Bessemer's invention?

15. In the history of man's use of metals find an illustration of the appropriative stage; the adaptive stage; the creative stage. Were the two African savages in the creative stage?

16. Some writers, speaking of stages in man's progress, talk of "the bronze age." Why could man live better in "the bronze age" than in "the stone age"?

17. Cite as many instances as you can where the knowledge of chemistry is used in modern making of iron. Was chemistry at work when the African savages made iron, even if they were not aware of it?

18. Look at the chart on page 95. Write down a list of the thoughts which it brings up in your mind.

19. Draw up in parallel columns a comparison of steel making by (1) the African savages and (2) modern methods. Here is a start; carry it on as far as you can.

Points of Comparison	*Savage Methods*	*Modern Methods*
1. Use of science.	1. Not aware of science.	1. Much dependence upon science.
2. Amount made.	2. Small; 10 lbs. per day.	2. Great; 1 blast furnace equals 200,000 savages.
3. Quality.	3. Good, but irregular.	3. Good, and very uniform.
4. Mechanical devices.		
5. How carbon was put in.		

20. Draw up in parallel columns a comparison of the way iron and steel were used in 1500 and are used to-day. Carry on this start.

Points of Comparison	*Use of Iron and Steel in 1500*	*Use of Iron and Steel To-day*
1. Power devices.	1. Almost none.	1. Makes possible our mechanical power devices.
2. Machines and tools.	2. Very little.	2. The main element in tools and machines.
3. In food production.		
4. In clothing making.		
5. In amusements.		
6. In transportation.		

21. "Man is just beginning to have a chance to live well." Explain as far as light and fire are concerned. Explain as far as metals are concerned.

22. Make a list of cases where fire has been harmful to our living together well. Do the same for iron and steel. What is the remedy? Can we as separate persons do anything to help? Can society (in the form of the city or state) do anything to help?

23. "It is not enough for man to master nature. He must also learn to be a wise master." What does this mean?

24. Write a theme on the kind of life that would be possible to-day if we had no fire.

25. Write a theme on the kind of life that would be possible to-day if we had no metals.

26. Make the charts called for on pages 84 and 102.

27. Answer the questions at the beginning of this chapter, page 73.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter III.

1. How Early Man Tamed Fire (illustrations of early fire making).
2. The Manufacture and Use of Artificial Gas (one of man's invisible servants).
3. Earthenware and Porcelain (fire gives us pottery: our use of ceramic products).
4. Harnessing Rays of Light (what the lens has meant for living well).

See also:

Chapter VI, 2. Petroleum and Its Uses (what one natural resource means to us: the need of conservation).

Chapter XV, 4. Lighting a City (how a city performs one task).

Problems to think over are given in these reading selections.

CHAPTER IV

POWER AND THE MACHINE AS PHASES OF MAN'S HARNESSING OF NATURE

A. Man's Conquest of Power Devices
B. The Power-driven Machine

Questions to Keep in Mind while Reading This Chapter

1. By what methods has man been able to harness power for his use?
2. What is the modern machine? What is its composition?
3. What has the power-driven machine meant for our living together?

In the last chapter we saw how man has multiplied his powers by becoming able to command fire and the metals. In this chapter we shall see how he has harnessed great forces of nature by means of the steam engine, the gas engine, and the electric motor. The forces thus harnessed are used to drive the millions of machines, great and small, now used for all sorts of work.

It is easy to see that our power engines are merely devices to harness forces of nature. In the steam engine we have harnessed the expansive power of steam and made it push pistons back and forth to do our bidding. We have done the same thing in the gas engine, in which the expansive force of an exploding gas moves the pistons. We have harnessed the "pull" of the magnet in our electric motors.

How we have done these remarkable things will become clear as we go on with our study. At this time, however, we can see that the multipliers which we are to study in this chapter — power engines and machines — were made possible by man's earlier harnessing of fire and the metals.

Without the metals for our engines and motors we could not have any "harness" strong enough to hold the giant natural forces that have been tamed. Without fire we could not have the metals. Without fire we could not turn water into steam. Isn't it interesting how, in man's long climb upward, one multiplier has made possible another? That fact gives us great hope for the future. We hope that the multipliers we have to-day will give us many more multipliers in the future.

A. Man's Conquest of Power Devices

(How man has harnessed power with which to drive his machines.)

Even neolithic man had power devices — Man began to harness powers outside himself as long ago as the time of neolithic man. We have already seen an illustration of this in his bow and arrow, for the bow was nothing but a device to propel his arrow by harnessing the springy force of the wood. At this same time, too, he began to use domesticated animals as beasts of burden. No one knows just how man turned wild animals into domesticated animals. Perhaps he followed herds of wild animals around in the hunt and gradually learned to fence them in valleys, so that they would be available for slaughter as he needed food. Perhaps, with this as a start, he next tamed them and kept herds both as a food supply and as beasts of burden. Or perhaps he began by carrying home from the hunt young animals, or wounded animals, or animals that had been caught in his traps, and the children played with them and tamed them. Perhaps some animals, such as the dog, hung about man's shelter to pick up food and finally became tamed. And perhaps the domestication of animals came about through all of these and other ways combined.

Whatever may have been the way or ways by which man learned to tame certain animals, there can be no doubt that

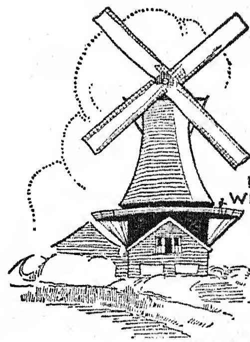
since the time of neolithic man he has used domesticated animals not only as sources of food supply but also as sources of power. Some tired hunter must early have found that the dog could bear a load upon its back, and one writer has suggested that the expression "to work like a dog" dates from that time. Man did not confine himself to the use of the dog. He has used quite a long list of animals as his beasts of burden and as his means of pulling or dragging loads. The horse was perhaps first used in Asia; the ass, in Egypt, although apparently it came to be more widely used in rougher regions, where its sure-footedness made it a most valuable servant. The auroch was early tamed in Europe and used as a plow ox. The ox became man's servant in Egypt; the humped ox, in India; the buffalo, in India and other far eastern regions. In Tibet there was the long-haired Yak, which was well suited to the high, cold plateaus. In South America the llama and alpaca were domesticated. In arctic regions man used the reindeer; in desert regions, the camel, whose ability to go for long periods without water was a most valuable asset; in various places, and especially in India, the elephant. All these and others were among man's early power-givers. He used, of the animals nature gave him, those which were best fitted for his needs and could most readily be tamed.

Courtesy of Herbertson: Man and His Work, (A. and C. Black, Ltd.)

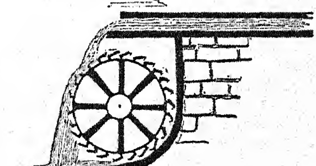
A YAK CARAVAN

Slow as these animals are, they are great aids to their owners because they are able to carry heavy loads.

After animals the winds and waters were harnessed. — Presently man began to harness the winds and the waters. We do not know just what the beginnings were. We do know, however, that man very early learned to use sails to catch the winds to drive his boats. Of course, sails are still used on our pleasure yachts and on a good many of our freight vessels. Much later man learned to harness the winds by means of the windmill. With it he ground his grain, pumped his water, and did other work formerly done by his own hard toil. The windmill is still man's servant, as many of our farmers can bear witness. Still later, man learned to harness the streams at rapids or at waterfalls by causing the water to run against the paddles of a great wheel. As this wheel revolved, it turned its axle, and the axle turned machines that did useful work.



A DUTCH WINDMILL

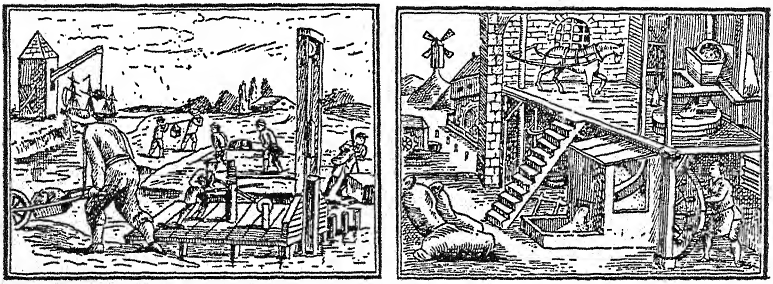


WATER WHEEL

Man had few power devices and machines two hundred years ago. — Once man had learned to tame animals and to command the winds and swift streams, hundreds and indeed thousands of years went by with only slow additions to his ability to harness the forces of nature. From time to time he added a few animals to his list of servants. Gradually he learned to make sails, windmills, and watermills of better materials and in better shapes. But "multipliers" were sadly lacking.

How true this is may be seen from the pictures on page 110. They come from an old book which tells of the power devices

and machines available in 1750 A.D. These were little better or more numerous than those of ancient Greece or Rome. The author points out that a man with a rigging about his neck can carry as much by pushing a wheelbarrow before him as two can carry on their shoulders with a pole, or as two can carry by a hand barrow. He shows, too, that by using a lever one can move an even greater weight on rollers than on the wheelbarrow. He might well have shown horses



MECHANICAL DEVICES IN USE BEFORE 1750

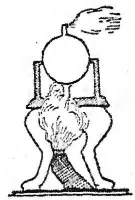
The left-hand picture shows various simple devices by which man was able to increase his powers. The right-hand picture shows that animals and the winds and the waters had been harnessed. How simple and primitive it all looks compared with our machines of to-day!

pulling a still heavier load on a wagon. In the background there is a crane used in unloading a ship. The old writer points out that this is a very useful device, "in which one, walking, draweth weights out of a ship or letteth them down into a ship." Of course, horses also could be used for this purpose. In the foreground a man is winding a rope around a capstan. This pulls up a heavy weight, which is then allowed to fall and drive a pile into the ground.

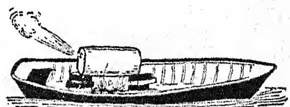
These were the more important "simple machines" which man then used as aids in his heavy work. The other picture shows us something of the mechanical powers that were available. There is a mill in which one stone is placed above

another, the power being provided by the man on the first floor turning a wheel by hand. The picture of the horse shows (the illustration does not show just how the work was done) that horse power was also used for turning such a mill. Back of the wall a water wheel can be seen and still farther back, a windmill. At the side is a ship mill, the paddle wheels of which turn as the water rushes by.

As we look at these pictures of the power devices that man had down to 1750, we realize how meager they were as compared with the giant engines and machines of to-day. We realize, too, that since 1750 man must have found many "multipliers." Let us see what they were.



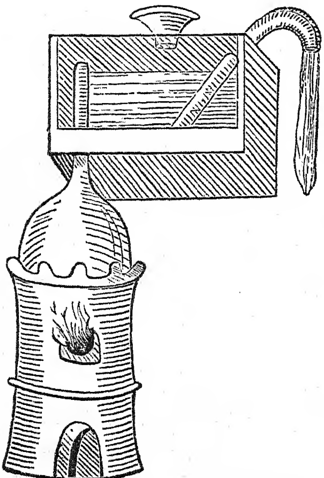
HERO'S ENGINE



MODERN HERO'S ENGINE

Two thousand years of speculation about steam. — We begin with the story of the steam engine. As a really useful instrument the steam engine is a thing of yesterday. It was, however, preceded by nearly two thousand years of wondering about steam and what it could do; of tinkering with its power without seeing how that power could serve us.

About 130 B.C. Hero of Alexandria made the so-called "aeolipile," or "ball of the winds." This, as the picture shows, was just a globe partly filled with water which could be heated and turned into steam. It had hollow, bent arms out of which the steam rushed. The kick, or reaction, of the steam caused the globe to revolve. Many a boy to-day has used exactly the same idea by punching two or three holes in one end of a tin can, putting some water in it, and placing a fire under it on a board or a crude boat. When steam pours



Courtesy of Thurston: Growth of the Steam Engine, (D. Appleton and Co.)

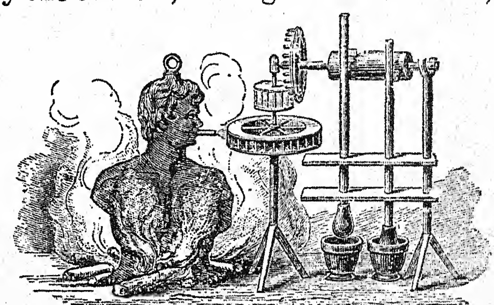
PORTA'S "ENGINE," 1601 A.D.

This crude picture is copied from Porta's book. Above the furnace is a boiler, which reaches up into a box filled with water. The steam crowds into the box and forces the water out the pipe at the right. Steam does some work!

from the holes, the boat moves as a result of the use of this "can of the winds."

Hero's "engine" was merely a toy of no practical use. If any similar toys were made later, we know little or nothing of them until about the year 1601 A.D. In that year an Italian, Porta, made a device for forcing water out of a tank by means of the expansive power of steam. This seems child's play to us to-day, but it is interesting and important in the development of the history of the steam engine. It showed that men had come to understand that *the expansive power of steam could be used to do work.*

From this time on we hear of several steam devices, but we shall stop to study only one of them, the engine of the Italian, Branca. In 1629 Branca described an engine which, as the picture shows, was simply a jet of steam blowing against a flanged wheel. The steam made the wheel turn just as swift water makes a water wheel go around. There is no



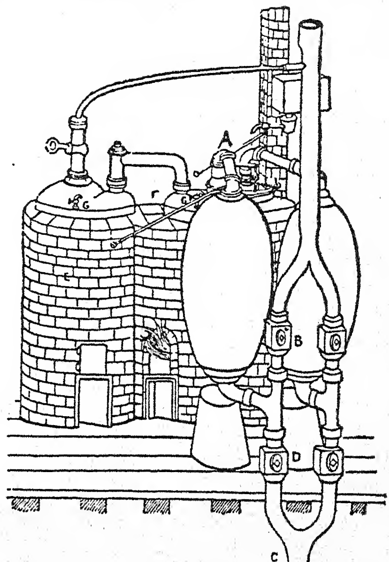
Courtesy of Thurston: Growth of the Steam Engine, (D. Appleton and Co.)

BRANCA'S ENGINE, 1629 A.D.

Branca tells us that this device could be used for pounding drugs and for other purposes. Steam does work!

new idea in the Branca device. It used the kick of steam, and Hero did that centuries earlier in his "ball of the winds." It is, by the way, exactly the same idea that is used to-day in the steam turbine engine, in which the force of a blast of steam is applied to a series of flanged wheels. Isn't it interesting that an idea which was used as early as 130 B.C. had to wait until 1884 A.D. before it gave us the steam turbine engine?

Torricelli, Savery, Papin, and Newcomen gave us engines that worked.—*Torricelli's discoveries.*—We come now to the time of really important happenings leading directly to our steam engine of to-day. The Italian scientist, Torricelli (born 1608, died 1647), made what was then the amazing discovery that air had weight and that the weight or pressure of air was sufficient to "do work." Everyone knows to-day that it is the weight or pressure of the outside air that causes mercury to rise to a height of thirty inches in a vacuum tube (a barometer) at sea level. Everyone



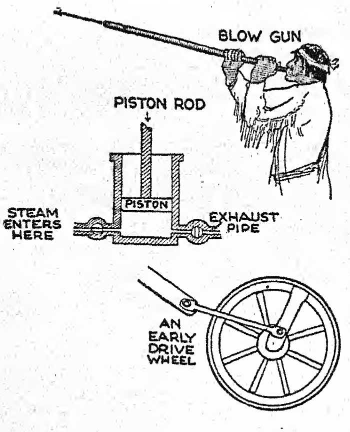
Courtesy of the Encyclopedia Britannica

SAVERY'S ENGINE, 1698 A.D.

The brick work was a furnace and boiler. The stopcock *A* would be turned and steam let into the oval vessel. That stopcock would then be closed and cold water would be allowed to trickle over the outside of the vessel. By cooling the vessel in this way, the steam inside was condensed into water, and since 1,700 cubic feet of steam make only one cubic foot of water, there would be a partial vacuum in the oval vessel. The stopcock marked *D* would then be opened on a pipe *C* leading down into the water which was pumped out, and the weight of pressure of the outside air would cause this water to rush up into the vessel. This stopcock *D* on the down pipe would then be closed, the steam cock at *A* again opened, and the rush of steam into the vessel would force the water up the pipe leading up to the top of the mine. After this had occurred, the stopcock marked *B* on the up pipe would be closed, the steam would be condensed by having the water trickle over the vessel, and the whole process would go on again.

knows that it causes water, which is much lighter than mercury. to rise in a vacuum tube to the height of thirty-three feet, and that we make use of this fact in our suction pumps. But we know such things because of the studies of Torricelli and the long line of scientists since his day.

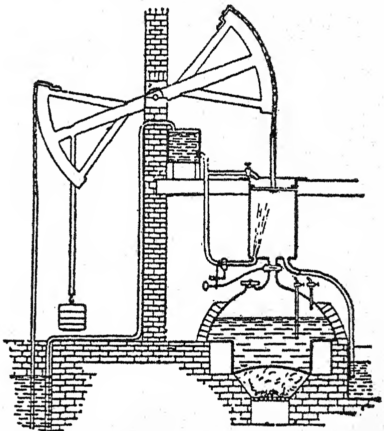
Savery's air-pressure engine. — This power of the air to do work because of its weight was used in 1698 by Thomas Savery to make a water-raising engine. As can be seen from the picture on page 113, this engine had no pistons. It was simply a device that let the weight or pressure of outside air push water up into a vessel in which a vacuum had been made. This engine really worked. It was used not only in pumping water out of mines but also in supplying houses with water. Savery's engines were, however, not very satisfactory. They were very slow, wasteful of fuel, and unsafe.



Papin's piston. — The next step was for someone to invent a piston. This was done by one Dennis Papin, a French scientist, who, it happens, was also the inventor of the safety valve. There is nothing hard to understand about a cylinder and its piston. As is shown by the accompanying diagram, the piston fits closely inside the cylinder. There is a pipe through which the steam is fed into the cylinder, and its expansive power pushes the piston up. You can do exactly this same thing by taking a tube and putting in it a soft paper wad that fits fairly snugly. By blowing into the tube you can make the wad slide along to the other end. That is all there is to the piston, but man

had to be on the earth many thousands of years before he learned to use it in a steam engine, although very primitive savages used exactly the same principle when blowing poisoned arrows from a blowgun.

Newcomen's air-pressure piston engine. — The next important step was taken by the Englishman, Newcomen, who, in 1705, made an engine which used the piston. Oddly enough, however, his engine did not use the expansive power of steam. It used merely the pressure of air. The picture shows that Newcomen's engine had a beam with a weight attached to one end. This weight would drop and pull the piston up to the top of the cylinder which you see below the other end of the beam. Steam would then be let into this cylinder from the boiler below and the stopcock turned off. A jet of cold water was then forced into the cylinder. This condensed the steam and made a vacuum in the cylinder. The pressure of the outside air forced the piston down and caused useful work to be done at the other end of the beam.



Courtesy of the Encyclopedia Britannica

NEWCOMEN'S ENGINE, 1705 A.D.

At the lower right-hand corner are the furnace and boiler leading up into the cylinder. The picture shows a jet of cold water being thrown into the cylinder from its lower left-hand corner. This will cause a vacuum and the weight of the outside air will push the piston down.

In this engine, as in all the earlier engines, these stopcocks were turned by hand, and the process was a slow and awkward one. A bright but lazy boy, Humphrey Potter by name, who had been hired to open and close the cocks of one

of Newcomen's engines, found a way to attach strings to the moving parts of the engine in such a way that these strings would open and shut the valves at the right time, and thus cause the engine to run itself more regularly, rapidly, and dependably. This made the engine "automatic" or "self-running." All our modern engines are automatic.

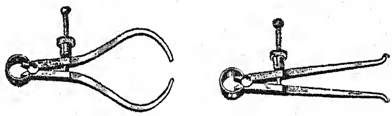
Watt added the basic features of the modern steam engine. — The engine of Newcomen was so nearly the modern steam engine that it is hard to believe that fifty years had to go by before the next really great improvement was made. Such was, however, the case. The genius of James Watt (born 1736, died 1819) was needed.

Steam pushes the piston! — In the year 1763 a model of one of Newcomen's engines was sent for repair to the University of Glasgow, where Watt was a mathematical instrument maker. He became very much interested in the machine and worked out many improvements. In 1782 he patented his great device — that of *using the expansive power of steam to push the piston* instead of depending upon the pressure of the outside air to do it. And in that same year he patented the so-called "double-action device," which means that the expansive power of steam was applied first to one side and then to the other side of the piston. He now had the essential features of the modern steam engine.

The importance of precision. — Watt is known as the father of the steam engine although, as we can easily see, he really built upon the work of the inventors who had gone before him. Watt had the great advantage of being both a scientific man and a very able mechanic. His scientific training enabled him to know what he ought to do. His mechanical skill enabled him to do it well and to make his engines really effective. This mechanical skill was far more important to him than it would be to an inventor to-day, for

in Watt's time there were not many "instruments of precision" which made possible careful measurements and fine work. There were, furthermore, very few smiths who could make parts properly and fit them together as accurately as is needful in a steam engine.

For example, Watt thought himself very fortunate if his cylinders came within three-eighths of an inch of being true cylinders. Automobile mechanics to-day work in terms of one-thousandth of an inch in their cylinders! It was a terrible task to get really good cylinders in Watt's day. They were very expensive. It is perhaps not too much to say that the invention, in the late 1700's, of a machine that would bore cylinders made possible the wide use of the steam engine, since it enabled engine builders to get good cylinders at a reasonable cost. This shows us one reason why we are to-day able to build so many and such good machines. We have learned "to make machines to make machines." They do their work more rapidly and more accurately than we could do it with hand tools.



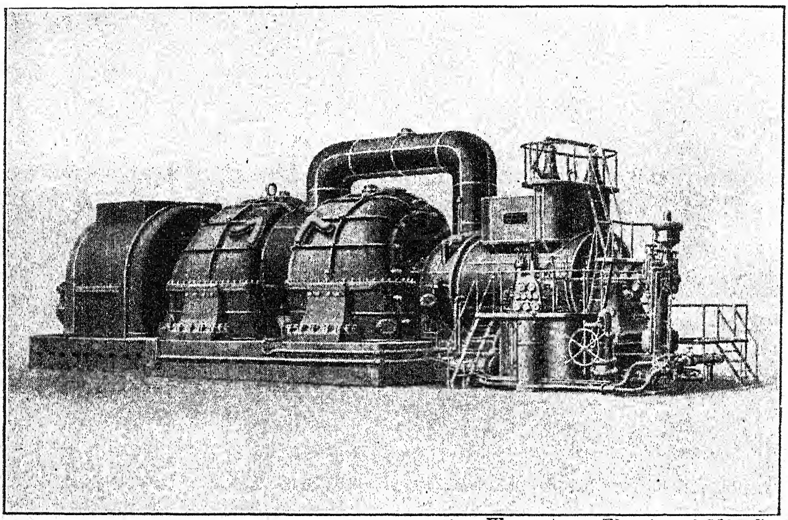
CALIPERS

These are instruments of precision for measuring length. We have other instruments for measuring weight, time, etc.

The compound engine and the turbine. — The story of the later development of the steam engine is not a matter which greatly concerns us, but we ought to know of the compound engine. It was known, as far back as Watt's time, that not all the "push" of the hot steam was used up in the cylinder. Various experiments were conducted, especially those of Woolf in 1804 and M'Naught in 1845, and as a result we have to-day the compound engine which lets out into a second (and even into a third) and larger cylinder, the steam that has done only a part of its work in the first

cylinder. This gives us the "double expansion" and the "triple expansion" engines. Since such engines get more work out of the steam, they save coal. They cost more, however, because of the cost of the added cylinders and the more complex mechanism.

We ought to know, too, of the turbine engine. As we have seen (see page 113), this engine runs because of the kick of



Courtesy Westinghouse Electric and Mfg. Co.

A Modern Turbine Engine

By noticing the ladders one gets some idea of the size of this giant.

jets of steam against flanged wheels. These engines cost a great deal to build, but they are very powerful for their size. They are, accordingly, quite useful in cases where there is not much space available. The really effective turbine steam engine is a very recent device. It dates from 1884.

Summary statement of the harnessing of steam. — Here is a summary of the stages of the harnessing of steam in the engine:

1. Men learned that the expansive power of steam could do work.

2. Men learned that the weight of air could do work.

3. Men learned that the weight of air would do its work on a piston in a cylinder.

4. Men learned that the expansive power of steam would do its work on a piston in a cylinder.

5. Men made and are making great improvements in the steam engine.

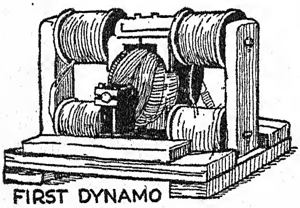
The gas engine and the electric motor came much later. — Once man had learned to use the "push" of steam to move pistons back and forth, it would seem easy to take a next step and use the "push" of an exploding gas for the same purpose and thus get the gas engine. As a matter of fact, man was a long time taking this step. Huygens, in 1680, exploded gunpowder in a cylinder fitted with a piston, and then cooled the cylinder and caused the outside air to "do work" in just the same way that it did work in Newcomen's steam engine. This was a beginning. But it was not until about 1867 that our inventors gave us the gas engine in such form as to be a really useful servant. Its great development has taken place only in the last twenty-five years.

For our purposes the gas engine is just another device to harness nature's powers, and we do not need to study its mechanism in the way we worked through that of the steam engine. We need merely to recognize the fact that, in its own place, it is a useful device. It is used where relatively small amounts of power are needed, as in the automobile, in farm machinery, and in small factories. It is also used to furnish large amounts of power in our steel mills because the gas is secured so cheaply from the blast furnaces.

So, also, we do not need to work through the mechanism of the electric motor. The ideas behind the motor are very

simple, even if the machine is complex. The scientist Faraday, in 1831, discovered how to cause electrification cheaply and regularly by means of a machine. He found that when a wire is moved near a magnet, an electric current is started in that wire! That being true, he made a machine that would move many wires past a magnet in an even, orderly manner. Each wire produced a little current. Added together, a good total was secured. That was our first dynamo, or machine for harnessing electricity.

The next step (taken much later) was to make the electric motor. Eventually it was discovered that if an electric current were turned into wires arranged in a certain way and placed near a magnet, those wires would "push themselves," so to speak. That being true, if these wires were properly fastened on a cylinder, or "drum," their push would cause the drum to revolve on its axis and do useful work. That is the simple idea concealed in the complex electric motor.


FIRST DYNAMO

Although Faraday found out how to make an electric current by mechanical means in 1831, it was not until forty-two years later (in 1873) that we found out how to run a motor by means of this electric current. Since that day progress has been rapid. Electricity is now "generated" at coal mines or at waterfalls and is transported over wires for scores of miles and then turned back into power by the motor. Its use in street railways, in terminals for steam railways, in factories, and in other ways is steadily increasing. It will certainly play a great part in the power of the future. Many persons predict that the future is to be an "age of electricity."

The use made of mechanical power to-day is tremendous. — Now that we know the kinds of modern power engines, let us inquire how much of this power is used to-day. What does it mean for our living together?

Meaning of horsepower. — When Watt was working with his engine, he tried to estimate the amount of work it did. Naturally enough, he compared its work with that of a horse. His study convinced him that a sturdy dray horse, pulling a load along the street, did work equal to lifting 33,000 pounds one foot in one minute. He called this "one horsepower" and it has ever since been used as our power standard. When we say, therefore, that an engine has 100 horsepower, we mean that it is capable of doing this amount of work: it can lift 100 times 33,000 pounds (or 3,300,000 pounds) one foot every minute.

Figures too vast to have meaning. — No one knows exactly how many horsepower are available in the United States to-day in our steam engines, our gas engines, and our electric motors. The following estimates are probably too low, but at least they give us something to think about.

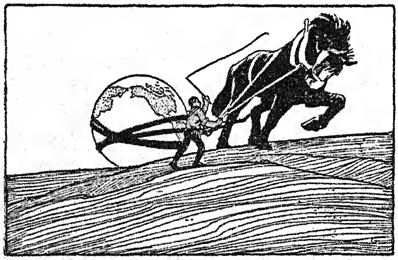
Horsepower Used in Various Ways in the United States

In manufacturing	32,000,000
In street railways	5,000,000
In electric light and power	20,000,000
In naval vessels	11,000,000
In merchant vessels	45,000,000
In locomotives	70,000,000
In automobiles	250,000,000
In miscellaneous ways	2,000,000
Total	435,000,000

The total is 435,000,000 horsepower. Our minds can not grasp what is meant by 435,000,000. We get still less from the statement that this means that our mechanical powers

in the United States to-day could lift 14,355,000,000,000 pounds one foot every minute.

Let us translate these figures into terms which we can grasp. The number of gainfully employed persons in the United States is about 50,000,000. Our mechanical powers are equivalent to the use of 4,350,000,000 such persons. Our human workers are thus multiplied at least eightyfold by the use of mechanical slaves! Or put it another way. Every man, woman and child in the United States has forty mechanical slaves!



To-day Horsepower Moves the World

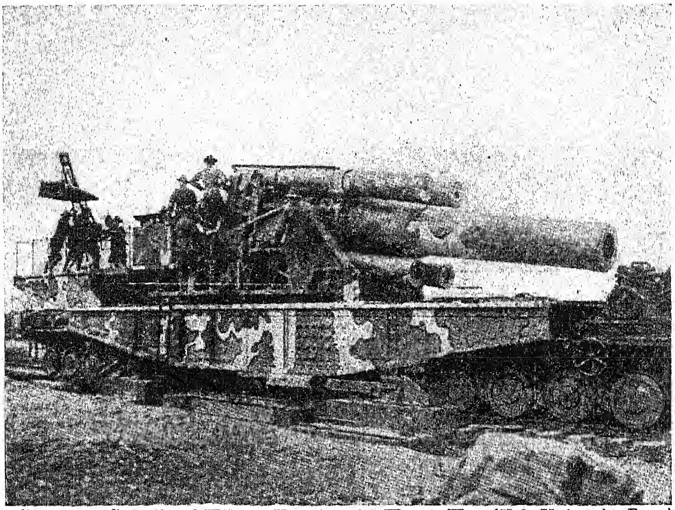
A review of the story of man's harnessing of power. —Let us think back over this fairly long account of man's harnessing of power and recall its main points.

1. *A long period of slow progress.*—For thousands of years man made very slow progress in his power devices. Animals, the winds, the waters, the springy substances were practically the entire list from the time of neolithic man down to about 1750. Even after man learned that there was some kind of force in steam, two thousand years went by before there was a steam engine. Such facts put real meaning into the statement: "Man's progress has been a long, slow climb."

2. *Importance of science.* — Although we have not yet studied the part that scientific knowledge plays in man's harnessing of nature, we begin to sense the fact that it is a very important part. A scientist proved that the weight of air can do work and thus pointed the way to the early engines. Other scientists showed how to make exact measurements and thus made possible "instruments of precision,"

and these made possible well-built machines. Faraday showed how to generate an electric current. These are only a few samples of the aid that scientists have rendered.

3. *Importance of multipliers.* — We get a new sense of the importance of multipliers. One multiplier makes possible another: fire and the metals made possible the power engine. One multiplier multiplies another: the engine, by



Courtesy of Crowell and Wilson: How America Went to War, (Yale University Press)

THE MODERN SUBSTITUTE FOR THE THROWING-STICK

hauling loads and running machinery, enables us to make vastly more metal and so multiplies our metal. A multiplier may even multiply itself: a given machine may make other machines which will make more of the original machine! We harness nature and then drive her to harness herself! And we do it ever faster and faster. As a result we use to-day such quantities of power that the figures cease to have much meaning other than to produce a feeling

that we have greatly multiplied our control over natural forces.

4. *The newness of it all.* — It is amazing how short a time we have had our modern power devices. As a means of seeing more clearly how new our power devices are, let us make a chart similar to the one on page 84, using this heading:

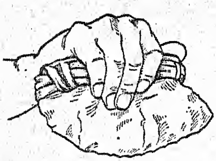
SIX HUNDRED YEARS OF HARNESSING POWER

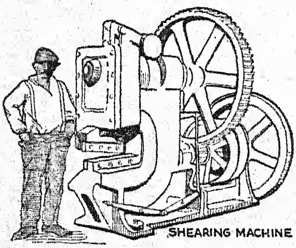
Locate on this chart the more important events mentioned thus far in this chapter. Where do you find them in large groups?

B. THE POWER-DRIVEN MACHINE

(What the machine is and what it has meant for our working and living together.)

We have talked a great deal of tools and power and machines. It is now worth our while to see just what a modern machine is, and how it is related to tools and to power. We can do this best by a series of illustrations.



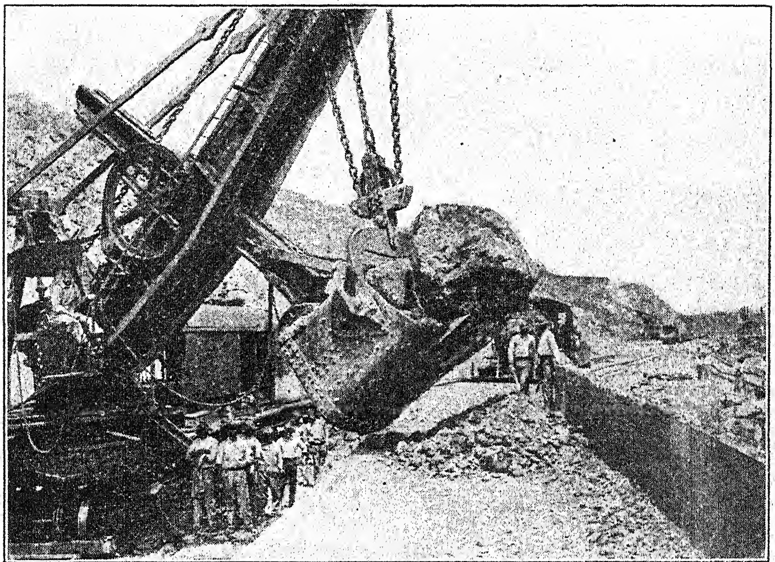


SHEARING MACHINE

The machine is a tool set in a mechanism and driven by power. — *Cutting machines.* — On page 19 is a picture of the crude stone knife of Neanderthal man. He got it by breaking off a flake of flint. The sharp-cutting edge had to suffice as a knife. Here is a picture of the so-called "woman's knife" of our American Indians, the knife of neolithic times. Neolithic man had learned to put a grip or haft on the knife. The knife that we use to-day is not greatly different except that our knife is made of steel. But now

notice what we have when we take this simple tool, the cutting knife, fit it into a big mechanism and apply power to it. We have a monster shearing machine. At one stroke it cuts down through a piece of steel many square inches in area.

Digging machines. — Take another case. On page 33 there is a picture of the digging stick of primitive man.



A Modern Steam Shovel

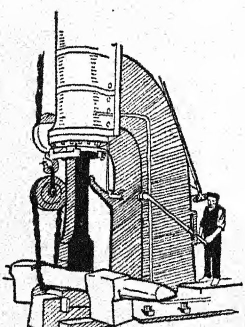
An idea of the size of this monster can be secured by noticing how it compares with the pictures of the men.

There is also a picture of a bone attached to a handle, the primitive hoe. We have all seen the hoes and shovels of to-day. Such a simple tool as the shovel, attached to a complex mechanism and driven by steam power, makes the huge steam shovel (above), which can handle four hundred cubic yards of material per hour. When this giant is used as an ore scoop, it will pick up ten to fifteen tons with as

much ease as you could scoop up a double handful of sand. It does the work of scores of men.

Throwing machines. — Let us look at another illustration. Neanderthal man could pick up a stone and hurl it at a foe or at some animal prey. On page 86 there is a picture of the throwing-stick of neolithic man. If you have ever been in the country in the autumn, you may have seen a boy take a cornstalk three or four feet long, dig out a little hole in one side of the stalk near one end, insert a pebble, and then by means of this throwing-stick hurl the pebble several times the distance he could throw it by hand. But compare that with some huge machine of war which harnesses the expansive power of exploding gunpowder and hurls more than half a ton of metal a distance of twenty or thirty miles. Indeed, you may have read how, during the World War, smaller shells were thrown a distance of seventy miles.

Hammering machines. — On page 19 is a picture of a crude stone hammer used by Neanderthal man. He simply seized a suitable rock and pounded with it. On page 22 there is a picture of the hammer of neolithic man, which had a handle or haft. The carpenter's hammer of to-day is not different in principle although it has been improved in its materials. But compare these with the modern steam hammer (the first steam hammer was patented in 1842), which strikes a blow of a hundred tons or of one hundreth of an ounce, as its operator chooses. It does this under perfect control and does it automatically. The hammer has been set in a mechanism that is worked by power. The results are amazing.



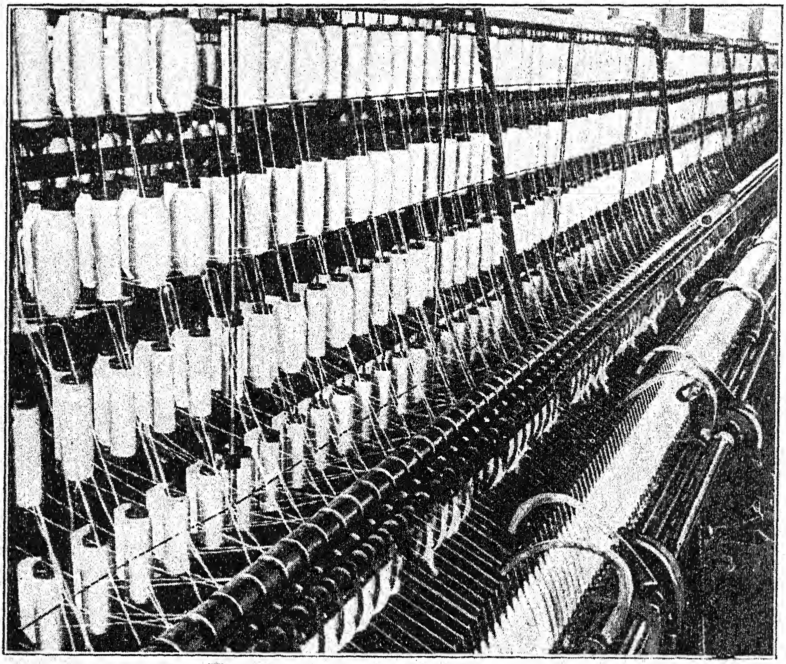
STEAM HAMMER

Grinding machines. — On page 36 there are pictures of the mortar and the crude stone mill used by the Iroquois in grinding their meal. As time went on, man learned to make this tool of better materials, to set it in a mechanism, and to drive it by power. The result is the modern flour mill, making in a single day enough flour to fill 17,000 barrels.

Spinning machines. — Or notice the picture of an Indian squaw rolling a thread between her hand and her knee. She could not make much thread in a day. Then look at the picture of the spindle, which is just a tool for twisting thread. Such a tool made it possible to turn out far more thread in a day. This same tool, as far as principle is concerned, has been attached to a complex mechanism and is now driven by power. On page 128 it is shown doing its work in a great modern factory. Hundreds of spindles are whirled in huge machines at the rate of 10,000 revolutions per minute. What a multiplication of simple tools!

What the machine is.—From these illustrations we can readily see what a machine is, and why it is able to do its work so well. A machine is a tool (or many tools) set in a mechanism which is driven by power. It is a device for multiplying the use of simple tools. It multiplies the use of tools, in the first place, by holding far more of them than can be grasped by man's hands. It multiplies their use, in the second place, by driving them far faster and with much more power than man's arm possesses.

It is worth noticing that the simple tools which are set in our machines are not in their nature (but merely in their shapes and materials) different from the grinding tools, the perforating tools, and the various other tools described on



TWISTING THREADS BY MACHINERY

page 85 when we were taking a peep into the tool chest of neolithic man. The spindle and the hammer are good illustrations of this fact. Great as our progress in the last hundred years has been, it nevertheless rests back upon the progress made thousands of years ago by early man!

The list of our gains from the machine is an impressive one. — If we were to make a list of the gains that have resulted from our use of the machine, it would run thus:

1. *Immense power.* — Our power machines (such as the engine) enable us to harness the expansive power of steam, the expansive power of a burning gas, and the power of electricity. They force these giants to do our work for us. When such giants do our bidding, we can produce more goods and better goods.

2. *Rapid and tireless work.* — Our machines can work steadily for long periods of time. And they can work more rapidly than can the human hand. They are tireless. Their wood and iron know no fatigue. They need no rest periods except for repairs and cleaning. The fact that they can work so continuously and so rapidly is another reason why they enable us to produce more of the goods we need.

3. *Accurate and delicate work.* — They enable us to do many kinds of fine and delicate work, which we could scarcely do without them. Since we can now build them so accurately, they work very precisely. The machine that set this type you are reading put the letters in line far more precisely and with much more accurate spacing between lines than you could print them with a pen. In watch-making we use machines to make watch parts so small that the whole watch movement (which contains 150 different parts) can be covered by a dime. The parts are, furthermore, all perfect. This so-called "iron monster" — the machine — can work with an amazing delicacy of touch and can accordingly give us goods of excellent quality.

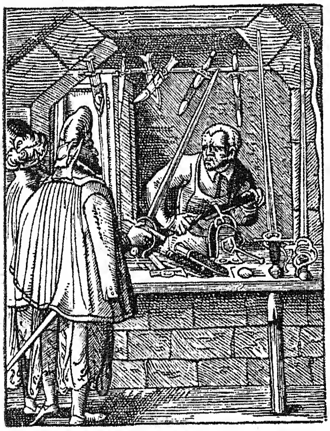
Men worked together very simply in the days before the power-driven machine. — The power-driven machine has had a great influence on the ways we work and live. We can see this more clearly if we go back only one hundred and fifty or one hundred and seventy-five years and see how people worked and lived when they had almost none of these

devices. We can do this by taking a snapshot of English life as it was before 1750.

Hand-tool manufacture. — On page 110 there are pictures of the power devices and simple machines that people then used. Wind-power, water-power, and horse-power devices are shown, but we need to remember that most of the power used was man-power and that the few machines of that day were very weak. Nearly all the work of that time was done by persons using tools, not machines.

Goods were not made in giant factories in those days. They were made in little workshops that were usually unoccupied rooms of the house in which the maker lived. The very word "manufacture," which comes from the Latin words *manus* and *facio* and means "making by hand," shows how things were made. The hats, knives, spurs, gloves, candles, clothes, and other goods of the day were *made by hand* with simple hand tools. The work was so simple that people "learned trades" by living and working for several years as apprentices in the family of one of these "manufacturers." When the apprentice was sufficiently trained, he started just such a shop for himself and, perhaps, began to train other apprentices.

Simple small-scale conditions. — Of course, there were not in these simple workshops great numbers of persons working for wages, as is true in our factories of to-day. Commonly the "manufacturer" worked alone. He might have an apprentice or two. They did not get wages; they got training. Sometimes he had two or three "journeymen," who did work for wages. In the main, the manufacturer owned his own tools and worked on goods which he himself owned and sold. He had few assistants, and most of these assistants were not wageworkers. They were apprentices who were learning the trade.



Sword Maker.

Armourer.

Spur Maker.

Shoe Maker.

Courtesy of Lacroix: Manners and Customs, (*Chapman and Hall, Ltd.*)

MANUFACTURING BEFORE 1750

These pictures, which are quite typical, show hand-tool work carried on in little shops. Notice that the customers have come directly to the little shops. In how many cases does the "manufacturer" have workers?

The goods were sold or marketed in an equally simple way. Most of them were sold to fellow townsmen. Quite commonly the fellow townsmen came to the little shop, and the goods were "made to order." Or the goods might be made and displayed for sale in the shop window (see the picture of the shoe maker) or in the town market place. It is true that some goods were sold to people of other towns. A few were sold to people of other countries. Most of the marketing, however, was done with neighbors and was of a simple, personal kind.

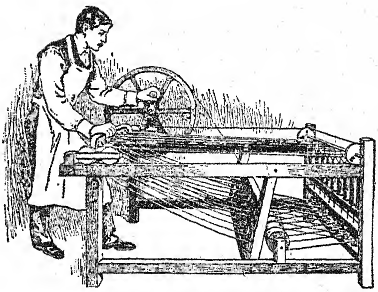
The society in which these people worked and lived was equally simple. It was a group life very unlike ours. If we think back over our account of man's harnessing of nature, we remember that the houses of that day must have been small and wretchedly heated and lighted. If the streets were paved at all, they were paved with rough cobblestones. There could have been no matches, gas lights, electric lights, waterworks, railroads, street cars, steam engines, high buildings, big stores, moving pictures, or many other things which make up such a large part of our city life to-day. It was a simple, humdrum existence.

Since 1750 great changes have occurred in our working and living together. — This quiet life was very quickly and very greatly changed. Let us make a list of certain happenings, asking ourselves why each event meant a great deal in our harnessing of nature and in changing our ways of working and living together. Let us think of each event in the following list as one the meaning of which we are to explain.

1. *Metals.* — Between 1739 and 1762 men learned to use coke and anthracite coal for smelting iron ore. What did this mean in our mastery of metals? What would increased mastery of metals mean in our working and living together?

2. *Power.* — Between 1769 and 1784 Watt learned to make a steam engine that worked well. What did this mean in our working and living together?

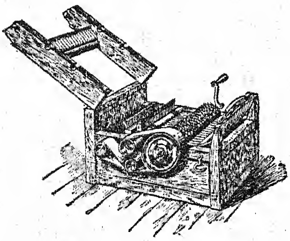
3. *Machines.* — Between 1764 and 1792 man learned to make cloth by machinery instead of tools. For example, in 1764 Hargreaves made a machine that would spin eight threads at a time. Others made machines that would spin many more than eight at a time and do it very rapidly. In 1785-9 Cartwright made a loom (a machine for weaving cloth from threads) that was driven by water power. Of course, it was not hard to see that the steam engine could also drive looms. In 1792 Whitney invented the cotton gin, a machine that took seeds out of raw cotton pods very rapidly and so furnished the great quantities of cotton needed for machine spinning. These are only samples. What would they mean for cloth making? Could people make more cloth? Better cloth? Would these machines need larger places to work in than the little workshops? Would they cost so much that not everyone could afford to buy them? Would those who could not afford to buy the machines probably work for those who could afford to buy them?



Courtesy of Robinson and Beard: History of Europe, (Ginn and Company)

HARGREAVES' SPINNING JENNY

Compare this with modern spinning as shown on page 128.



Courtesy of Bogart: Economic History of the United States, (Longmans, Green and Company)

WHITNEY'S COTTON GIN

In thinking about the changes that were taking place in our living, we need to remember that this introduction of machines into cloth making is just one illustration of what was taking place in all industries. The "machine age" was coming in.

4. *Transportation.* — Between 1750 and 1830 we greatly increased our ability to move ourselves and our goods about. Great improvements were made in canals and in roads. Then, in 1807 Fulton gave us the steamboat. In 1819 the first steamship crossed the Atlantic. In 1825-29 the first steam railroad was built. We shall hear more of these and other communicating devices in Part III, but even now we can see something of what they mean to us. In what ways do they let people move about to other lands more freely? What things can you name which you probably would not be able to eat or to wear except for such devices? In what ways have they helped to bring together and to feed in great cities the thousands of workers employed in our factories? Do these workers use them?

5. *Scientific knowledge.* — From 1700 on, great advances took place in physics, chemistry, and our other sciences. After 1830 and especially after 1860, we set up schools for training mining engineers, electrical engineers, chemical engineers, mechanical engineers, and a host of others. Without waiting to read about them in Chapter V, can you tell some of the ways these engineers affect our working and living together?

It is quite clear that since 1750 great changes have taken place in our working and living together. Before 1750 was the tool age. After 1750 is the power-driven-machine age. Most of the things we use have been made, wholly or in part, by machines. Can you name even one thing you use which has not been touched by a machine? Can you name many?

As time has gone on, an increasingly large part of our goods is made in giant factories employing great numbers of workers. True, many small factories still exist and will continue to exist, but they make only a small part of our goods. For example, in 1920, 3.6% of our 290,000 factories made nearly 68% of the total product; 20.5% of our 290,000 factories made nearly 92.6% of the total product. All the rest of them (nearly 80%) were so small that they made only 7.4% of the total product. In other words, more than nine tenths of our manufactured goods are made in large plants. How different this is from the situation before 1750 when everything was made in small shops!

The great changes we have described are a part of the Industrial Revolution. — We have come to call the period since 1750 in which these great changes (and others which we have not mentioned) have been taking place, the period of the Industrial Revolution. We call it this, because in a short time such great changes took place in working and living together that it seems a very different world — a revolutionized world.

As a means of seeing how rapidly the changes came about, let us make another chart similar to the one on page 84, giving it this heading:

SIX HUNDRED YEARS OF THE POWER-DRIVEN MACHINE

Locate on this chart the more important events mentioned on pages 124 to 134. Is it not clear that many important events took place fairly rapidly? Did we need six hundred years in this chart?

Let us now make a table which will review these changes and show that they were great changes. We shall have the table deal only with town life and with manufacturing. Parts of the table are left blank for you to fill in.

	Some Conditions before the Industrial Revolution	Some Conditions To-day
Where were the goods made?	In small shops; generally in the home.	In great factories. We call it large-scale production.
Did people work in groups at making things?		
Did workers use tools or machines?		
How did people learn to make things?	By the apprentice system. There were no public schools.	In public schools and sometimes in schools run by employers. Apprenticeship not greatly used.
Where were goods sold?	Mostly to people of the same town.	All over the world. We say there is a "world market" to-day. We get goods from everywhere.
Did most people work for wages for others?		
Did the workers own their tools?	Generally, yes. We must remember that the manufacturer was usually also the worker!	Sometimes, but not often. The tools to-day are set in very expensive machines.
Did the worker own the finished goods?		
Did the worker generally expect to be a manufacturer sometime?	Yes. Apprenticeship was long, but once a person became skilled there were few expenses in starting his own business.	He has some opportunity to do so but most workers do not *expect* to do so.

Some Conditions before the Industrial Revolution		Some Conditions To-day
Did people move about much? Did they know much of the rest of the world?	Very little. A seventh-grade boy or girl of to-day knows vastly more about the outside world than an old person of that day knew.	Very much. Are not our relatives usually scattered? Do we not have immigration? Do we not find geography and history of other peoples important?
What did a town look like?	Small houses, wretched streets. Towns were usually so small that the "manufacturers" often tilled land outside the town.	
How would a city look after dark?		
Would there be crowds of people on the streets going to work in the morning and returning at night?		
Would parts of the town have clouds of smoke from factories?		

Did this chapter justify its heading? — The heading of this chapter was "Power and the Machine as Phases of Man's Harnessing of Nature" (fire and the metals were discussed in the preceding chapter). Is it not clear that man is harnessing nature when he uses power and machines? Is it not clear that we harness nature to-day vastly more than did primitive man? Is it not clear that we are able to live better as a result? Is it not clear that we have become good harnessers of nature so very recently that probably we are just beginning to be good harnessers? Is it not clear that *one* thing our schools are trying to do is to make us good harnessers of nature?

Problems

1. Define or explain:

Air pressure	Turbine
Automatic	Safety valve
Natural environment	Piston
Multipliers of man's powers	Instruments of precision
Gang, or group, labor	Industrial Revolution

2. Give some illustrations of the use to-day of domestic animals for power; of the use of the winds; of water.

3. Notice some big locomotive. Where is the power supplied? What is the power? Where is the piston? What illustrations can you see in the engine of the need of very precise work? If a neolithic man could suddenly see one, would he think it was "magic"?

4. Different peoples at different times have held slaves. Is slavery a device for harnessing power? Does it increase the total power available or merely determine who shall command existing power?

5. If we were to build the pyramids to-day, what devices should we use?

6. Savery's engine could draw water up only about twenty feet instead of the thirty-three feet mentioned on page 114. Why? All these early engines were ineffective compared with the same kind of engine if we were to build one to-day. Why?

7. Write out a paragraph telling what Watt contributed to the steam engine.

8. "The machine to-day is a tool plus other things." What other things?

9. Why cannot as large quantities of goods be made with hand tools as with machines? Are hand-made goods always better than machine-made goods?

10. Look again at the pictures showing the power devices and machines of the 1700's (page 110). Take each device and mention something we have to-day that makes the old one seem puny and feeble.

11. "We make machines to make machines to make machines to make goods we desire." Why is that worth while? Why go at it in such a roundabout way? Why not go directly at making the goods?

12. "Machines not only make *more* machines; they make *better* machines than can be made without them." Why?

13. Can you name any power devices and machines that you use when you play? When you are on your way to play?

14. Can you name any machines that help us enjoy our leisure time?

15. It costs a great deal more to build a factory and start it running than it used to cost to start a simple workshop. Prove that this is true.

16. Take any article of food on your dinner table and talk over with your parents the extent to which it is a result of power and machinery.

17. "One doesn't really understand what it means to get a drink from a faucet until he realizes how much nature had to be harnessed before it was possible." In what ways did fire help? Metals? Power? Machinery?

18. "One doesn't really understand what it means to switch on an electric light until he realizes how much nature had to be harnessed before it was possible." In what ways did fire help? Metals? Power? Machinery?

19. In how many cases do you know who made the different articles you are wearing? Would a person living in 1700 know in more cases than you?

20. Find out how many of the articles in your home are made in factories. Are your clothes so made? Your shoes?

21. Write out a paragraph telling what the steam engine has meant to the way goods are made.

22. How many uses can you name for the gas engine to-day?

23. "The machine is a device for multiplying the use of simple tools." Illustrate.

24. Someone has said that an inventor usually makes merely some minor addition to things that have been worked out before. Does this seem true to you? If true, does it mean that the work of inventors is unimportant?

25. "We build upon the progress of the past." Give four illustrations of this from our account of man's harnessing of nature.

26. "Man's progress has been a long, slow climb, but apparently he is now getting on ground where he can run." What does this mean? Is it true? What illustrations can you give that the earlier climb was slow?

27. What studies in your school deal with any part of the problem of harnessing nature? Does mathematics? Show that it helps to make possible instruments of precision.

28. Recently a man who had been in a penitentiary for thirty years was freed. The story runs that he was taken through one of our cities and that he was terribly frightened. He could not judge how fast automobiles and street cars were running and had several narrow escapes. Do you see how this might well be true? Does it show how our living conditions are changing?

29. Amuse yourself by imagining what surprises you could spring on a Rip Van Winkle who went to sleep in 1870 and just woke up to-day. What are some of the things you could do to him?

30. On page 119 there is a statement of certain stages in our harnessing of steam. By what date had each stage been reached?

31. Make the charts mentioned on pages 123 and 135.

32. Answer the questions at the beginning of this chapter, page 103.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter IV.

1. Effect of Machinery upon Rural Life (what the power-driven machine has meant for country dwellers).
2. Inventions and Patents (what the government does to encourage inventions).
3. Thomas Alva Edison (a glimpse of an inventor at work).

See also:

Chapter III, 2. The Manufacture and Use of Artificial Gas (one of man's invisible servants).

Chapter VI, 2. Petroleum and Its Uses (what one natural resource means to us: the need of conservation).

Chapter VIII, 3. The Mastery of the Air (a quite recent chapter in the story of man's conquest of distance).

Chapter X, 1. The Story of Paper Making (how paper is made; the enormous quantity used).

Chapter XII, 1. Colonial Cloth Making and a Modern Factory (an example of the growth of specialization).

Chapter XII, 2. Canning Corn (an example of specialists working to supply our food).

Problems to think over are given in these reading selections.

CHAPTER V

SCIENCE, THE CREATIVE STAGE OF MAN'S HARNESSING OF NATURE

A. Science: Man's Greatest Tool
B. Man on the Highway of Progress

Questions to Keep in Mind while Reading This Chapter

1. How does scientific knowledge increase man's powers over nature?
2. How did man get this scientific knowledge? How has it developed and of what is it composed?

In our study thus far it has been said that scientific knowledge is the greatest of all harnessers, but we have not stopped to see what that means or why it is true. Those are the tasks of this present chapter. This does not mean that the chapter is to be a textbook in science. By no means. A study of the laws of the various sciences is worth far more time than that. You will wish to spend years at it. All we shall do in this chapter is to see science as a servant of man; to see it as a tool — a *thinking tool* — which man finds tremendously useful.

A. Science: Man's Greatest Tool

(What science is and why it is the greatest of all harnessers.)

Two stages in the development and use of knowledge illustrated. — When I was a country lad of twelve, the state, as a means of protecting crops, offered a reward of ten cents for each ground-hog scalp turned in at the county courthouse. My father gave me a .22 rifle and told me that I could keep any money I got from ground-hog scalps. This

was a task to a boy's liking. It is not surprising that I became a good marksman.

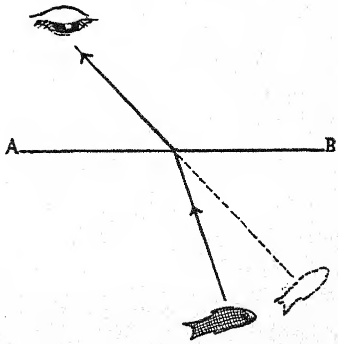
One day, while walking along a river which flowed through our farm, I saw some fish swimming. At that time the shooting of fish was not forbidden by the game laws of the state, so I tried to shoot some. I was not able to get a single fish. I tried again and again on succeeding days, using various schemes in my shooting, but I got very few fish. Happening to mention my difficulties to my father, he said, "Of course; you must aim below a fish in the water in order to hit it." When I asked him why, he could give me no reason. He simply said that he knew that it was true, that he had been told that was the way to shoot fish, that he had tried it, and that it worked. I went back to the river with this rule in mind, and, sure enough, it worked.

1. *The trial and error stage.* — Quite without knowing it, I had illustrated in my fish shooting two stages, or steps, in the development and use of knowledge. The first stage is the trial and error stage which is "a groping after something by trying everything." One tries and tries various things. Some "work," or "are right"; others "do not work," or "are wrong." Perhaps you have seen a boy trying to put a wireless set together by such methods. You have almost certainly seen a baby trying to fit puzzle blocks together by "trying everything." That was the stage I was in before I talked with my father.

2. *The rule of thumb stage.* — This first stage is followed by a second stage in which one comes to use "rules" based on the ways that "work," without knowing *why* they work. We say that such rules are rules of thumb. Perhaps if I had kept at the job of shooting fish I should have stumbled upon the fact that I needed to shoot below them. Others had done so and had passed that rule on to my father. He passed

it on to me. But neither of us knew "the why" of it. We merely shot fish by rule of thumb.

Two more stages in the development and use of knowledge illustrated. — A few years later I studied physics at the high school in the neighboring city, and one of my textbooks talked of this very problem of shooting fish! In the book the problem was worked out by men of science who had found the "why" of it. Scientists had discovered, after much study and experimentation, that when a ray of light goes on a slant from one body (like the water) to a less dense body (like the air), the ray of light actually bends, or refracts, in the process, so that the fish was really nearer the bank of the stream than it seemed to be. In the diagram the line *AB* represents the surface of the water. A ray of light going from the fish bends at the surface of the water and goes to the eye of the observer in such a way that the fish seems to be farther away than it really is.



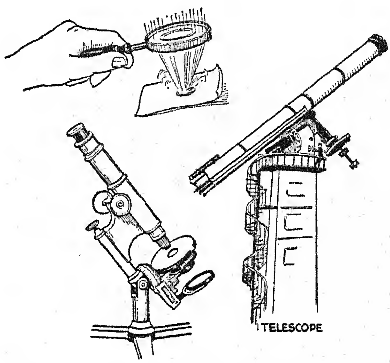
The physics book explained all this. It pointed out that since rays of light act this way, one needed to aim under the place where the fish seemed to be. This was a *rule of action* based on a *scientific law* about the way rays of light perform.

3. *The stage of forming scientific law.* — My high-school experience showed stages *three* and *four* in the development and use of knowledge. The third stage is illustrated by the scientists who study how rays of light act under all sorts of circumstances and conditions. These men are not interested in shooting fish. They are curious about rays of light and

eager to know how they act. After much study, experimentation, and measuring, they find that rays of light bend, or refract, certain amounts under certain conditions. They then draw up brief general statements (we call them "laws" of science) about that bending. Here is one such general rule: "a ray of light passing from a more dense to a less dense medium is refracted away from the common perpendicular." The very word "science" becomes full of meaning to us when we reflect that it comes from a Latin word which means "to know." Now, the "knowing," or knowledge, of the scientist is not vague. It is knowledge which has been carefully measured and tested and then stated in a general way. In brief, this third stage is that of the discovery and formulation of scientific law.

4. *The stage of rules of action based on scientific law.*— The fourth stage is that of making rules of action based on scientific law. How do these differ from the rules of thumb (see page 142) of the second stage? Very much! To begin with, rules based on scientific knowledge are more measured and exact and accurate; hence they give better results. They are worked out with instruments of precision, (see page 117). More important still, they are *general* and may therefore be used for many purposes, thus multiplying man's powers. Take our light rays. Science gives general statements about them. They *always* act in certain ways under certain conditions. There was nothing peculiar about their action in the fish-shooting case. They act the same way with other bodies, as you can readily see by putting a coin in a dish and then standing where the edge of the dish just hides the coin. Have someone pour water into the dish, and you now see the coin! In other words, once we know how light rays act, we can get rules of action not only for shooting fish but for other purposes as well. By way of an example of these other pur-

poses, we build our microscopes and telescopes in accord with the laws of light, and new worlds are opened up to us! Clearly our powers are greatly increased when we make use of laws of science which are general in character.



THE LENS, THE MICROSCOPE, AND THE TELESCOPE

The development and use of knowledge illustrated by medicine. — Let us work through these same four stages of the development and use of knowledge, using medicine as our illustration.

1. *Trial and error in primitive medicine.* — The trial and error stage is seen in the medical work of all primitive peoples. When one of their number becomes ill, many things are tried in the hope that something will help. Drums are beaten to frighten away the evil spirit causing the illness. Or perhaps some more pleasing dwelling is provided for the evil spirit, such as a yellow bird for a jaundice-spirit or a frog for a chill-spirit. Strange mixtures are prepared for the patient to drink; he himself is beaten or rolled about or starved (see page 62); some one else fasts for him,—these are only a few samples of what blind ignorance, anxious to help without knowing how to help, does in such a case.

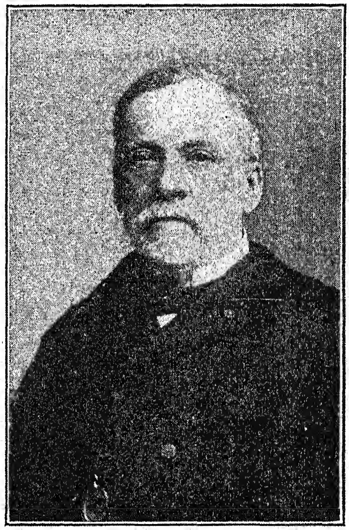
2. *Rule of thumb in medicine.* — As time goes on through thousands of years, such a group will gradually enter the second stage and develop rules of thumb concerning what to do in sickness. They gradually find that a certain kind of leaf makes a good bandage for a wound; that a certain drink made by steeping another kind of leaf gives relief when the patient is hot with fever; that a tight bandage helps certain kinds of pain. These are just rules of thumb. The people do not know why the rules work.

Of course, along with good rules of thumb there are certain to grow up bad rules of thumb, and it is amazing how long people keep on following the bad rules. We do not need to go clear back to primitive peoples to find bad rules being followed in sickness. For example, we need to go back only a few score of years to find this remedy still proposed: "Against all kinds of witchcraft, take a great beetle; cut off his head and wings; boil him; put him in oil and lay him out; then cook his head and wings; put them in snake fat; boil; and let the patient drink the mixture." What nonsense! Another example is the use of a powder scraped from the tombstones of saints as a remedy. It is true that such remedies were a bit unusual, but it was quite usual to advise people to wear charms to ward off sickness and evil spirits.

Even after many rules of thumb, good and bad, have been made, there will still remain kinds of sickness and pain for which no rules have been worked out. For these, the drum-beating and pinching and pounding and other trial and error methods are still likely to be used.

3. *Building up the sciences basic to modern medicine.* — The third stage is that of the slow building up of scientific knowledge in the form of general laws. The sciences that have been found most useful in dealing with sickness are

anatomy, which tells of the various parts of the body and how they are put together; physiology, which explains the usual or normal workings of these parts; bacteriology, which makes general statements concerning germs, or bacteria; psychology, which tells of the workings of our minds; and chemistry, which treats of the composition of substances, including our bodies and drugs and foods.



Louis Pasteur

We cannot stop to discuss these sciences. They are quite new. It was not until 1628 that Harvey discovered the circulation of the blood and thus gave a basis for a real understanding of the work of the heart and lungs and blood. It was not until 1743 that Haller did the great work in anatomy that has caused him to be called the father of anatomy. It was not until the work of Lavoisier (1743-94) that chemistry was put on its modern basis.

This brings us down to the nineteenth century. In 1839 the really effective microscope was invented; in that same year the cell theory, which showed how our bodies are made up, was established; in 1837-40 came the work of Müller, who is called the founder of modern physiology; in 1846 and 1847 anæsthetics, those great relievers of pain, were discovered in; 1859 Pasteur began the studies which resulted in understanding that many diseases are caused by germs; in 1868 antiseptics, or germ-killers, were used in surgical operations; in the early 1880's the germs of

typhoid, pneumonia, tuberculosis, hydrophobia, cholera, diphtheria, and lockjaw were identified; in 1895 the X-ray, later so useful in diagnosis, was discovered. These are only samples of our progress in the basic sciences, but they are enough to show that the third stage in the development and use of medical knowledge is very recent, — that it is still in its beginnings.

4. *Rules of action based on scientific law.* — The fourth stage is that of making and using rules of action based on scientific law. We are just getting started in that stage to-day in our dealing with disease, and we are making much use of what we call "institutions" in the process. Let us look at some of the institutions that are giving us rules of action about health matters. The examples that we shall examine are our medical schools, the United States Public Health Service, and the work of city health departments. They are only examples.

WHAT IS STUDIED IN ONE UNIVERSITY SCHOOL OF HYGIENE AND PUBLIC HEALTH

(The students have studied the basic sciences before entering this school)

1 Microörganisms which cause disease
2 Resistance and immunity; vaccines and serums
3 Primitive animal parasites; *e.g.* malarial parasite
4 Parasitic worms; *e.g.* hookworm
5 Insect disease spreaders; *e.g.* mosquito and flea
6 Control of infectious diseases, especially epidemics
7 Water supply, waste disposal, housing, and ventilation
8 Bodily functions and health
9 Chemical aspects of hygiene
10 Mental aspects of disease
11 The principles of nutrition and diet
12 Health rules for the individual
13 Motherhood and child hygiene.
14 Legal aspects of sanitation and hygiene
15 Records and statistics of births, deaths, sickness, etc.
16 Administration of public health work

Our medical schools teach rules of action. — The first institution that should be mentioned is the medical school. We have in the United States to-day over one hundred and fifty medical schools for the training of our physicians. Now, these schools, in training physicians, teach them rules of action growing out of the scientific laws of anatomy, physiology, chemistry, psychology, and bacteriology. If one wishes to practice medicine to-day, he must spend several

years studying these basic sciences; several more years in the medical school learning good rules of action and how to make rules of action himself; and then at least one year working in some hospital under the supervision of some experienced physician.

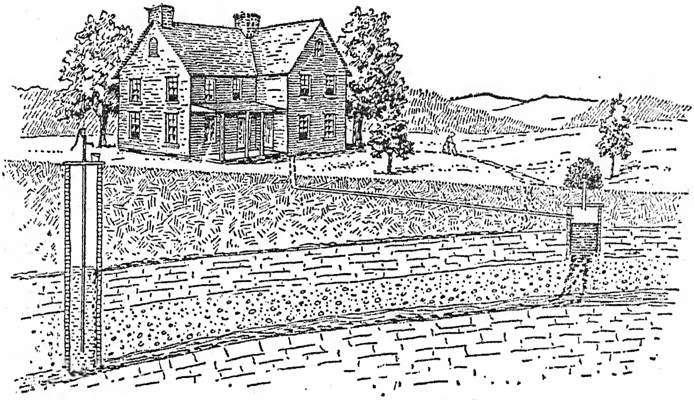
The Public Health Service makes rules and helps carry them out. — Another very interesting institution is the United States Public Health Service, one of the bureaus of our Government at Washington.[1] It is the duty of this service to coöperate with state and local health officers in dealing with health problems too large for the local authorities. It helped California fight the bubonic plague in 1900; it helped New Orleans fight yellow fever in 1905. In general, it helps at any time and place where there is an unusual outbreak of such epidemics as diphtheria or typhoid or infantile paralysis. Then, too, the Public Health Service gives advice, when asked, to city health departments; prevents diseases from being carried into the United States by the passengers or crews of ships; watches to prevent diseases from being carried from state to state on railroads and steamboats; and studies health problems in very many ways.

Our cities make and apply health rules. — The health institution with which we are most familiar is the health service of the city. We have asked our city servants to do so many things to safeguard our health that it is not easy to list them all.[2]

Disposing of wastes and providing pure water. — One of the first things we had them do was to get rid of wastes and refuse, which were great breeding places of harmful germs,

[1]The account of the work of this service is based on Lesson B-14, *Lessons in Community and National Life.*

[2]This account is based on Lesson C-19; *Lessons in Community and National Life.* The original phraseology is followed in part.

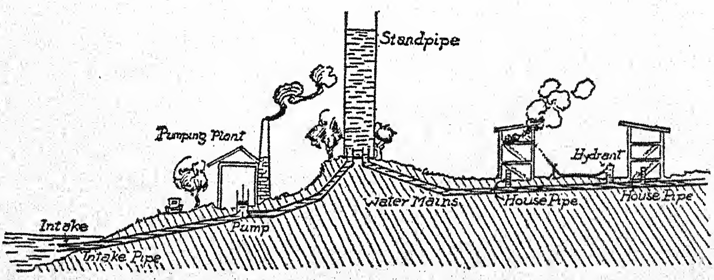


WHY WATERWORKS ARE NEEDED IN CITIES

This diagram shows that soils lie in layers, or strata. The impurities of the cesspool at the right are draining down into the well. Wells in cities are unsafe.

and of flies, which carried the germs to our food. We had our public servants build and operate systems of sewerage and of garbage collection and disposal.

Then, too, we use our public servants in getting a supply of clean, pure water. People can not have their own wells in the city, because they are sure to be unwholesome and to scatter such diseases as typhoid. Instead we build great

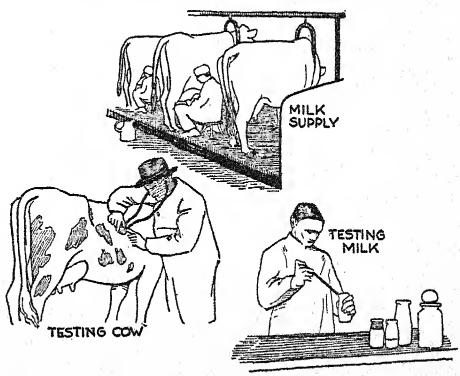


WATER-SUPPLY SYSTEM FOR TOWNS AND CITIES

This diagram illustrates how water can be pumped out of a lake or river into a standpipe. The high standpipe gives the pressure which sends the water through the mains to the houses and hydrants. We may thank power, fire, and the metals for this device.

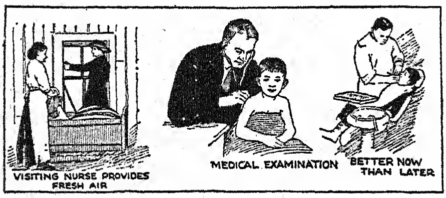
waterworks for the whole community and pay for them and their operation out of taxes. Some of these works are wonderful pieces of engineering, bringing water great distances. New York City brings water from the Catskill Mountains; Los Angeles, from the lower Sierras; and Chicago, from far out in Lake Michigan. Man's command over metals and power made such feats possible.

Clean, pure food. — After achieving waste disposal and clean water we turned our city governments toward securing clean food. Bakeries are now regulated in most cities to keep the bread clean. Basement bakeries are usually forbidden. Restaurants are supervised. To some extent our city officers protect for us such foods as fish, ice cream, and meat, although most of



our meat comes now from large packing houses that are inspected by the Federal Government. As for our milk supply, the farther city dwellers got away from the cow and the larger the number of people who handled the milk, the more impossible it was for anyone to know whether the milk he bought was going to be food or poison to him. It is no simple task to get good milk to the city dweller. If it is done thoroughly, inspectors must go out to see that proper care is taken on the dairy farms; transportation must be watched; bottling stations supervised; milk depots inspected; the milk itself frequently tested — all to see that it is kept free from dirt and disease-spreading germs.

Protecting health of children. — Let us look next at what the city health service does for little children. One of the great tragedies of our time has been the needless deaths of so many babies. Of the deaths each year, one half are of children under seven. Many of these child deaths would not have occurred if proper food, clothing, air, bathing, and other care had been given. The first step in preventing these child deaths is to have a system of prompt reports so that it may be known where all newborn babies are. Then comes the work of the visiting nurses, who call and give help and advice where needed. Infant-welfare stations are established where mothers may go for help and guidance about the care of their babies. Certified-milk stations are established where safe milk can be bought at reasonable prices. Clinics are held where expert physicians offer their services. Especially in the summer, such stations have saved thousands of lives in our larger cities.



As children grow older, a modern city does not forget them. Through medical examinations in the schools it discovers troubles in eyesight, in hearing, in teeth (troubles that can usually be rather easily helped) and gives advice and assistance to parents in curing them. It tries also to help children to live correctly by teaching them hygiene. In some states health officers examine children who apply for working certificates to see whether they are in fit condition and to guide them to wholesome work.

Protecting general health. — For the general health of the city we have still other activities. Health departments watch for, report, and isolate contagious diseases, such as

measles, diphtheria, and smallpox. They try to keep such diseases from spreading. They also help in the treatment of the sick either at home or in contagious-disease hospitals.

Cities have begun to pay attention to the houses people live in. Most cities require in houses a certain amount of air space for every person, a definite amount of window space in proportion to the size of the room, air shafts in the center of large tenements, sanitary plumbing, and running water. But so little has been done that the dangers to public health from overcrowded and unwholesome dwellings are increasing rather than diminishing. Here we meet the great difficulty that some families do not earn enough to pay for good living conditions.

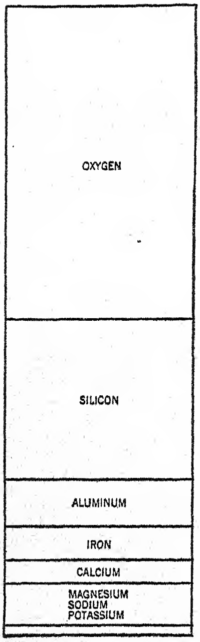
POOR HOUSING

Finally, we have learned that there is no real health without good play and a chance to be outdoors. The playgrounds and parks help the city in many ways. They keep people out of places of amusement that are not wholesome. They give an opportunity to meet friends in a social way, and above all they supply relief from the dull grind of factory and store life.

These activities vary greatly from city to city. Some cities do all these things and more. Others do few of them. Sometimes such things are done well; sometimes there is the merest pretense of doing them. We have gone just far enough to know that, if we will, we can make our cities places of light and air and wholesomeness.

Surely, when we compare the trial and error pounding and yelling and dancing of the primitive medicine man's way of

fighting disease with our own methods, we can have no doubt that our own ways are very much better. Scientific law and rules of action based on scientific law are meaning much in giving us better health. And let us remember that what is being done in the field of medicine is just one example of our many, many uses of scientific knowledge.



Composition of the Earth's Crust

Eight elements make up about 98 per cent of the earth's crust, while the other eighty-four elements make up less than 2 per cent of that crust. Some of the eighty-four which we hear much about are hydrogen, carbon, phosphorus, manganese, sulphur, nitrogen, gold, silver, chlorine, chromium.

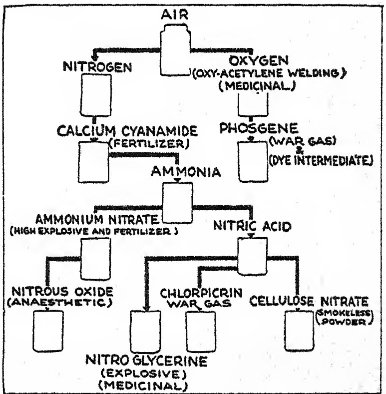
Chemistry illustrates the creative stage of man's harnessing of nature. — It may be worth while to look at still another illustration. Let us take chemistry. Chemistry treats of the make-up, or composition, of substances. Our chemists have made many astounding discoveries, but the one which interests us most just now is this: Although there are perhaps 300,000 very different kinds of substances in this world, these substances are all made up of various combinations of ninety-two elements! It is not surprising that so many substances can be made of ninety-two elements; the 750,000 words in our language are made up of only twenty-six letters, and such letters as *x* and *z* are not used a great deal. The surprising thing is that our chemists have been able to discover these elements and "tame" them for the use of man.

Of all the sciences chemistry is perhaps the best example of what we have called the creative stage of man's progress (see page 28). The reason is plain. Once we have learned what the basic elements used in our world are, we can "create" substances in just

the same way in which we create new words (such as "jazz") every year by the use of some of the twenty-six letters of our alphabet.

So, also, we can tear substances to pieces and make new combinations just as we can tear a word into its letters and make new words out of them. What a wonderful mastery this is over nature! What creative power it gives us!

But a word of caution is necessary. The matter is not as simple as it sounds. Substances cannot be torn to pieces and new ones built up as easily as we can arrange letters to suit our taste. Far from it. We have seen how hard it is to break up iron ore and to get iron (which is an element) from it. That is one of the simpler cases. Some substances resist far more than does iron ore. Further, the various elements (once we have them) cannot be juggled about as we choose. Some are stubborn and combine with others very haltingly. All of them act in accord with "laws of science" and not in accord with whims of humans.



SOME AIR PRODUCTS

How our scientists learned all this and what it all means is too long a story for this place, and it should be told by your science teacher in any event. It is enough for us, at this time, to know that it is a story of molecules and atoms. Just as

words are made up of syllables, which are made up of letters so also

substances are made up of molecules, which are made up of atoms

and there are ninety-two different kinds of atoms, and, therefore, ninety-two elements.

Some practical consequences of the use of chemistry.— The practical consequences of man's ability to work with these ninety-two elements (even if his work with them is done with difficulty) are almost beyond belief.

The utilization of wastes.— For one thing, man has become able to use great quantities of materials that he once thought were waste. Chemistry makes it possible to recombine molecules and make new substances. Sewage and garbage, even, are thus worked over into new substances. Slag from blast furnaces was once thrown away; now it is used to make cement. There are literally thousands of goods made to-day from materials that were once called waste. For this we may thank chemistry.

Goods produced more cheaply.— For another thing, the chemist has shown us how to make, and make cheaply, things that were formerly obtained from nature at great expense. Once, when man wanted dyestuffs,[1] he searched the wide world over to find colors. He sent divers down into the Mediterranean to rob the shellfish of his purple. He sent ships to the new world to get Brazil wood and to India for indigo. He robbed the lady cochineal bug of her scarlet coat. Man had to use the colors of plant and insects. But to-day any kind of dye found in nature can now be made in the laboratory as soon as its composition is understood. Usually, too, it can be made more cheaply and purer than when extracted from the plant or insect.

New substances created.— Again, the chemist has made substances very useful to man, which are not found in nature at all. For that matter, steel is such a substance.

[1]This account is based on Slosson, *Creative Chemistry.* (The Century Company.) In part the original phraseology is followed.

A great range of sciences and scientific institutions now serve man. — What is true of chemistry's service to man is true of other sciences as well. We need and use them all. Fortunately the list of them is steadily growing.

A wonderful institutional life has grown up around man's scientific knowledge. There are institutions devoted to pass-

SOME OF OUR MORE IMPORTANT SCIENCES

I. THE ABSTRACT SCIENCES
- A. Mathematics
- B. Logic
- C. Metaphysics

II THE PHYSICAL SCIENCES
- A. Chemistry
- B. Physics
- C. Astronomy
- D. Earth Sciences

III THE BIOLOGICAL (LIFE) SCIENCES
- A. Botany (plant life)
- B. Zoölogy (animal life)
- C. Physiology (activities of organisms)
- D. Morphology (form and structure)
- E. Ecology (response to environment)
- F. Bacteriology
- G. Embryology

IV PSYCHOLOGY

V THE SOCIAL SCIENCES
- A. History
- B. Economics
- C. Political Science
- D. Sociology
- E. Anthropology

COURSES IN BOTANY AT THE UNIVERSITY OF CHICAGO

Elementary Botany
Elementary Plant Physiology
Elementary Ecology
Methods in Plant Histology
Organic Evolution
The Local Flora

General Morphology of Thallophytes
General Morphology of Bryophytes and Pteridophytes
General Morphology of Spermatophytes
Special Morphology of Algæ
Special Morphology of Fungi
Special Morphology of Bryophytes
Special Morphology of Pteridophytes
Special Morphology of Gymnosperms
Special Morphology of Angiosperms
General Morphology of Fossil Plants
Special Morphology of Fossil Plants
Cytology

Ecological Anatomy
Experimental Ecology
Experimental Field Ecology
Geographic Botany
Physiographic Ecology
Ecological Surveying
Forest Ecology
Field Ecology
Applied Ecology
Plant Genetics

Seminar in Evolution and Heredity
Seminar in History of Botany
Research in Morphology
Seminar in Physiology
Research in Physiology
Seminar in Ecology
Research in Ecology
Research in Plant Genetics
Research in Paleobotany

General Plant Physiology
Plant Microchemistry
Plant Physics
Plant Chemics
Plant Production in the United States
Growth and Movement

The chart at the left shows something of the range of our modern sciences. It is a very abbreviated chart indeed, giving only main divisions. It is, even in its abbreviated form, a great view of the results of man's long development, and it is a great promise of the future, for never in the past has there been even a near approach to the powers which are in man's keeping, now that he has access to general laws of science.

The purpose of the list of courses at the right is to show how far we have gone in our study of one science. It is by no means an extreme case. Others have been carried farther. Do not try to understand all the terms.

ing on to others the knowledge that has been acquired. Of these, our *schools and colleges* are the best illustration. Then there are our *schools of technology* which translate the basic laws of science into practical rules of action. A partial list of such schools includes medical schools, dental schools, mechanical-engineering schools, mining-engineering schools, schools of commerce and administration, schools for

training social workers, schools of education, and agricultural schools. Finally, there are *institutions which carry on research.* These institutions work out new basic laws and verify or improve the old ones. In this group are found our great universities; research bureaus of government departments; the National Research Council, which encourages and helps research in all institutions; private foundations, such as the Rockefeller Foundation for Medical Research and the Bureau of Economic Research; and hundreds of research bureaus in our great business plants.

"Man has struck his tents. He has left the valleys of superstition and brutish life. He is out on the highway of progress."

B. Man on the Highway of Progress

(How we got our science and what we owe to it.)

Man began to heap up acquired knowledge thousands and thousands of years ago. — No one can say when man began to heap up the knowledge that was to become the science of to-day. Presumably the process began far back in the dim past. The trial and error stage, we know, is found even among animals. All of us have seen cats and dogs and other pets learn to push doors open by the trial and error method; all of us have heard of mice or birds or monkeys using the same method to get at food which had been put in a place hard for them to reach. Of course, early man could do as much.

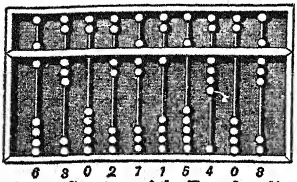
Indeed, man had great advantages over animals in such work. He had a better mind and could think things out. He had a better memory and could store up in his mind the "ways that worked." He could learn that it was not worth while to repeat the ways that did not work.

Then, too, the fact that he was a communicator helped him a great deal, for he could pass down to younger generations knowledge of ways that worked. The result was that, as the centuries rolled on, a modest fund of knowledge was built up.

Early man's knowledge was not scientific knowledge, but it was at least a beginning. — But there is a great difference between mere knowledge and science. Science is knowledge, but it is knowledge plus. "Science is exact, regular, arranged, classified knowledge." It is knowledge that has been carefully tested and measured and then put into the form of a general law. The savage knew a great many practical facts about stones and climate and food plants and animals. He had practical rules of thumb about making tools, raising foods, and many other matters. But he was thousands and thousands of years away from having general, scientific laws.

Fortunately for us, early man was not satisfied to stop with what knowledge he had. He was always adding to it. He was always trying to arrange it and classify it and make it general. Our study of the Iroquois showed that early man was a why-asking and a how-contriving person. He was a walking question mark! He was also a persistent generalizer. True, his generalizations were often poor ones. The best explanations he was able to work out about the world he lived in are called "myths," "belief in magic," and "superstition" by us. But let us very honestly salute those early "explanations" and the curiosity that caused him to make them. They are the humble beginnings of scientific inquiry and scientific law. Early beliefs were at least guesses at the *why* and *how* of things. Through long ages these guesses were improved and corrected and made into truer explanations. We are still doing the same thing.

There could be no science until men had become able to tabulate, calculate, and measure. — We can readily see why early man had such poor success in making general explanations of a sort that we should be willing to call science. Since science is exact, regular, arranged, and classified knowledge, it follows that man had to become able to measure, to count, and to classify before he could have scientific knowledge. Before one can cut down a tree, he must have tools to work with. Before man can make a science, he must have tools to work with.



Courtesy of the Encyclopedia Britannica

THE CHINESE ABACUS

The Chinese counting board consists of movable balls of bone or ivory strung on rods of bamboo. The first rod on the right is the "units" rod, the next is the "tens" rod, the next the "hundreds" rod, and so on. Each ball above the horizontal rod represents 5. If one of these is pushed down to the rod and three are pushed up from the bottom, we have eight (one of the fives plus three of the ones).

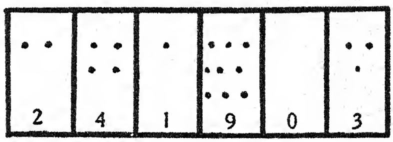
If we think of very earliest man, thousands of years went by before he could measure or count at all. Then other thousands of years went by before he became an orderly, systematic counter and measurer. Still other thousands of years went by before he became able to make general rules or laws of science.

Numbers and counting. — Let us begin with numbers and with counting.[1] Quite as you would expect, man started to count "on his body," and we have counted by fives and tens since the time of the savage days when fingers and toes were thus used. Among the Tamanacs of the Orinoco the word for five means "whole hand"; six is "one of the other hand"; ten is "both hands"; fifteen is "whole foot"; twenty is "one man"; and so on. As for our numbers, the Roman numerals I, II, III, etc., have come down from the days of picture writing, when a mark meant "one" — perhaps one finger.

The very words we use show how we began to keep track

[1] This is based largely on Tylor, *Anthropology.* (Macmillan & Co., Ltd.)

of our counting, for our word "calculate" comes from a Latin word meaning "pebble." In early days people "calculated" by putting pebbles in heaps as counters. The word for pebbles in time gave us the word for calculate. The Chinese abacus, or counting board, is just a scheme to keep track, in separate columns, of the number of pebbles that have been set aside for units, tens, hundreds, and so on. Our Arabic numbers are merely another way of doing the same thing, as may be seen from the following pebble-and-Arabic-number abacus showing the number 241,903. As you see, our Arabic numbers are just a kind of shorthand, a set of symbols, to use instead of quantities of pebbles! They are surely much more convenient.



OUR ARABIC NUMBERS IN ABACUS FORM

Measuring devices.—Precisely the same kind of story can be told of our measuring devices. Man first measured, as he first counted, on his own body. He began to measure by putting his hands or feet alongside objects. From those days there have come down to us such words as "foot," "hand," "span," or "mile" (from the Latin *mille passus*, meaning "thousand paces"). The time came finally when people (the Egyptians and Babylonians were among the earliest) made pieces of wood or metal of exact lengths to serve as *standards*. From that time measuring devices did not vary according to the size of the man who did the measuring. As time went on, standards were fixed for other kinds of measuring, such as weight and volume. To-day we have very many kinds of accurate measuring standards.

To-day, the governments of all civilized peoples set such standards by law. Our own government maintains at

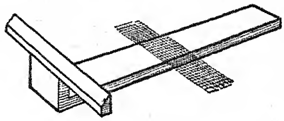
Washington a Bureau of Standards whose employees are constantly studying and working on measurements and standards. In the vaults of this bureau are kept the standard copies of the metre, kilogram, yard, pound, etc. Here are kept measuring devices that are little short of marvellous: a balance that will weigh within one-two-hundred-millionth part of its load; calipers that will measure to one ten-thousandth of an inch; ohmmeters that will measure electrical resistance from one one-hundred-thousandth of an ohm to 100,000 ohms; interferometers that will detect movement of one five-millionth of an inch; heat measurers of wonderful range and fineness. Year after year we find ways to make finer and finer measurements. Small wonder that our tools and machines to-day enable us to do accurate and delicate work! Small wonder that our scientists can arrange and measure more rapidly than they could a thousand years ago! Small wonder that we are wringing nature's most hidden secrets from her!

Man has certainly made much progress in his measuring tools since those primitive days when savages began to count or measure on parts of their bodies. Is it not interesting that primitive man (quite without being aware of it) was at work making the measuring tools which were later to be used in making sciences? Does it not make you feel that there are some real and worth-while things being worked out in the world when you see that thousands of years ago our savage forerunners were laying the foundations for the modern science that is of such benefit to us to-day? Does it not make you feel that, in a very real sense, you and I are coöperating with those unknown toilers of our dim past in carrying on the work and progress of the world?

The great development of science has occurred in the last two hundred years. — When man became able to count

and measure, he had the mental tools for beginning to make sciences, for he could now observe, measure, record, and arrange knowledge in an exact, orderly fashion. But it was a long, slow process.

The beginnings of science. — Over four thousand years ago people who lived in Egypt, Assyria, and Babylonia had made much progress in the art of living together. They had good rules of thumb in many fields. Their practical knowledge was far enough advanced for them to have painters, gem cutters, smiths, musicians, shoemakers, tanners, wine makers, sculptors, brickmakers, and many others. These peoples had, furthermore, so developed their measuring devices that they had a good bit of orderly, arranged, exact knowledge about the movement of the stars (astronomy) and the length of what we call the year and the hour. They knew how to survey and to compute areas and volumes (geometry: *geometria* means earth-measurement and may well have sprung up in the Nile Valley where the floods made necessary much surveying every year to find out the boundaries). They knew many causes and cures for diseases. Since these ancient far-Eastern peoples had this measured knowledge, which they expressed in general rules, we sometimes say that their work marks the birth of science.

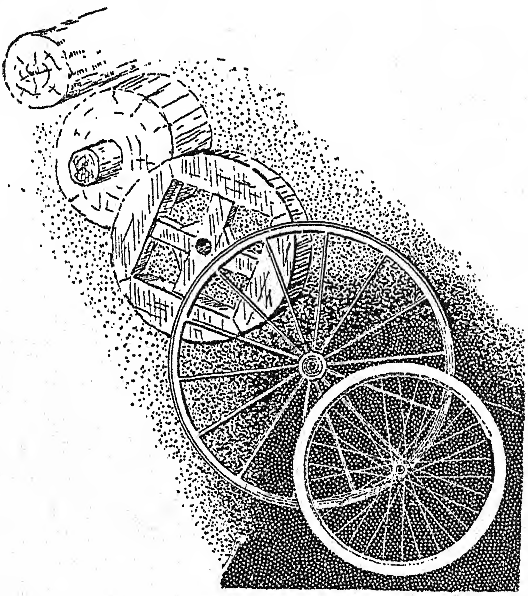


AN EARLY DEVICE TO MEASURE TIME

This is really a sundial. The position of the shadow tells the time of day.

Greek science, the dark ages, the rebirth of learning. — Of course, the full story of the development of science would take a thick volume. We cannot stop for it. In your history classes you will learn that these far-Eastern peoples did not carry their science very far. Some writers even refuse to call their knowledge *scientific* knowledge. It happened,

however, that their knowledge spread in various ways to the Greeks, who carried it farther and certainly gave it a scientific form. Later, it spread to Egypt and to the Hindus and Arabs, who played their part in its development. Then followed a period of very slow progress — a period of decline,



THE EVOLUTION OF THE WHEEL

Here is pictured the development from the log used by a savage to roll his canoe along the beach to the modern wheel with its pneumatic tire. We build upon the progress of the past.

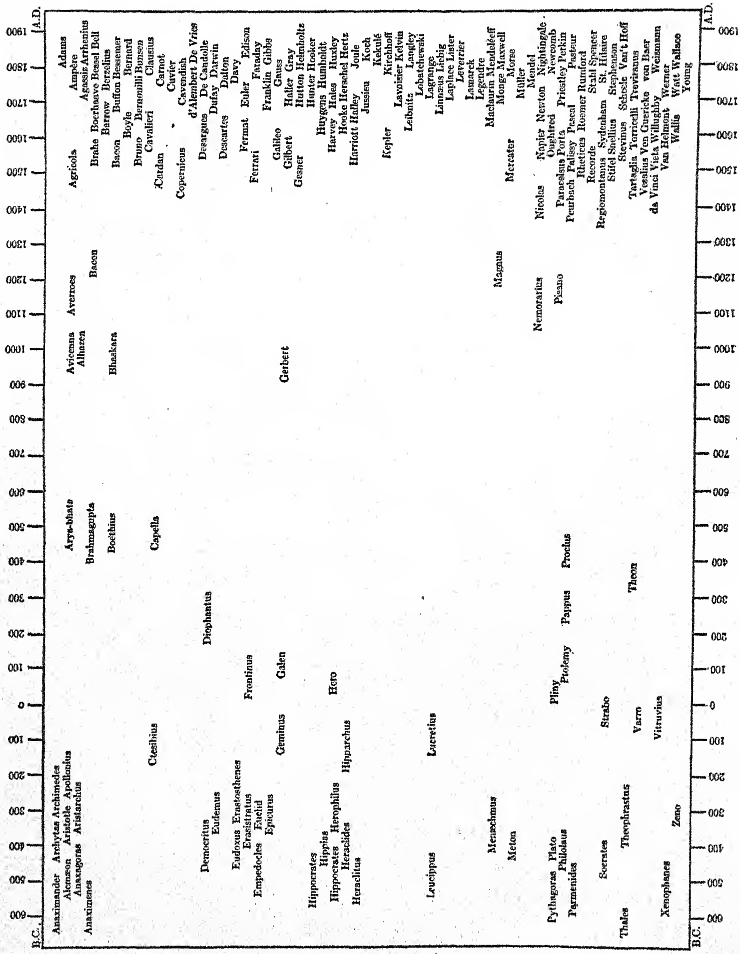
even — a period of "the dark ages." A "rebirth of learning," or Renaissance, or Great Awakening, took place in the thirteenth, fourteenth, and fifteenth centuries.

All of us know some of the things that happened about the time of this rebirth of learning. Man rediscovered that the earth was round (the Greeks, Alexandrians, and Arabs knew it long before), and Columbus discovered America.

Copernicus (and Gallileo with his telescope) demonstrated that the earth is not the center of the universe but that the earth and other planets revolve around the sun and that far, far outside of this "solar system" there are great stretches of other suns and perhaps of other worlds (Aristarchus the Alexandrian thought so about 250 B.C.). The mariner's compass, which enabled sailors to go far out at sea without getting lost, and the printing press, which greatly increased man's ability to pass knowledge along to others, date from this period. The most significant gain, however, was in spirit, attitude, and outlook. Men became experimenters; they refused just to "take another's word for it." They watched, observed, tried things, kept records of their experiments — all with the idea of making knowledge the "exact, regular, and arranged" knowledge that is science.

The recent great development. — This sketch of the history of science can be made more real by looking at the chart on page 166, which shows the life periods of the great thinkers. It is easy to see that there was a long period of slow growth, a period of decline, a rebirth of learning, and that we are now in a great outburst of activity. Since the chart comes down only to 1900 and includes almost no names of living scientists, it does not show that this outburst is still going on. If living scientists were included and the chart were brought down to the present day, its right side would be black with names.

This chart makes certain points clear to us. We see how true it is that we have heaped up our acquired knowledge over a long period of time, and yet that, measured against man's long stay on the earth, science is a very new thing. Its large development has occurred only in the last two hundred years. Its application in rules of action through

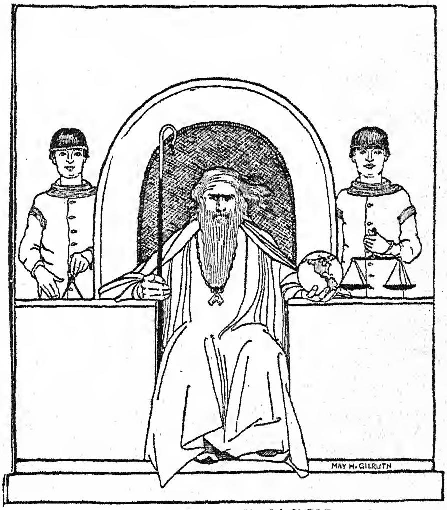


A Roll of Honor of Scientists

This chart shows that the Greeks made their greatest contributions 600 B.C. to 300 B.C.; then come some Hindu, Alexandrian, and Roman names. The chart is blank for about 300 years. Then comes a rebirth of learning, but there are not many names for another 500 years. The last 200 years mark the great outburst of scientific knowledge.

our schools of technology is a matter of the last fifty or seventy-five years. This helps us understand why the charts we made on pages 84, 102, 123, and 135 showed that so many of the important happenings in man's harnessing of fire, metals, and power are matters in the memory of living men.

A summary statement of what science does. — The ways by which science has multiplied man's powers are so numerous and so dazzling that it is not easy for our minds to grasp what it all means for our living together. If, however, we think back over our illustrations of the development and use of scientific knowledge, we see some points fairly clearly.

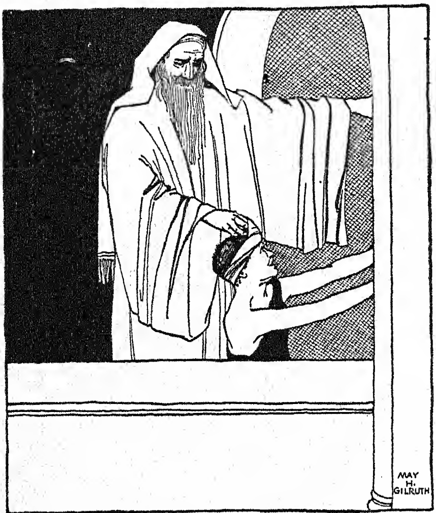


SCIENCE RULES THE WORLD

1. Science greatly increases man's powers over nature. It enables him to get rules of action from great general laws. It marks what we call the creative stage of man's development. He is no longer content with merely adapting things. He now creates in his own laboratories and workshops not only substances that may be found in nature, but many that do not there exist. Science is making him the ruler of the physical world.

2. Although the sciences which treat more directly of our living together, such as biology, economics, sociology and political science, are still very new, these sciences have already begun to tell us general laws about living together.

We know, for example, that certain kinds of mental diseases can be inherited and that it is dangerous to our living together that they should be passed down to younger generations. We know something of the motives that make people form groups and some of the things that happen when groups are formed. But the full discussion of the contributions of the "social sciences" must be postponed to Part IV.



SCIENCE FREES THE MIND

3. One of the most important things about science is the frame of mind, the mental attitude into which it puts us. There is such a thing as the "scientific habit of mind," and it is worth getting. A person with the scientific habit of mind will be an inquiring, careful, measuring, testing, generalizing person who will follow facts rather than opinions. His mind will be freed from such fears and superstitions as men once had, for he will see the world in terms of law and not in terms of magic. If his mind is really "scientific," it will be one full of imagination and one that senses the great beauties of our world, for there are few more beautiful or imaginative ideas than those which are connected with how our world is put together and how it may be made to serve man.

One hundred years *versus* all earlier years. — Wallace, in his book *The Wonderful Century*, compares the progress

of the nineteenth century with the progress made through all the thousands of years before 1800.[1] Thanks to science, the list of man's great achievements in the last hundred years is as long as that of all preceding centuries.

We get quite as striking a view of what man's ability to harness nature has meant during the last one hundred years if we imagine ourselves able to take a journey back through a hundred years and keep a record of the commonplaces of to-day that disappear during the journey. "We quickly lose the wireless, the telephone, the phonograph, and the graphophone. We no longer see the cable cars or electric railways. The electric lights have gone out. The telegraph disappears. The sewing machine, reaper, and thresher have passed away, and so also have all india-rubber goods. We no longer see any photographs, photo-engravings, photolithographs, or snapshot cameras. The wonderful octuple-web printing press, printing, pasting, cutting, folding, and counting newspapers at the rate of 96,000 per hour, or 1600

ONE CENTURY COMPARED WITH ALL PRECEDING CENTURIES

Some steps in progress in the nineteenth century	*Some steps in progress in all preceding ages*
1. Railways	1. The mariner's compass
2. Steamships	2. The steam engine
3. Electric telegraphs	3. The telescope
4. Telephone	4. The barometer and thermometer
5. Matches	5. Printing
6. Gas illumination	6. Arabic numerals
7. Electric lighting	7. Alphabetical writing
8. Photography	8. Modern chemistry founded
9. The phonograph	9. Electric science founded
10. X-rays	10. Gravitation established
11. Spectrum analysis	11. Kepler's laws on the Motion of Planets
12. Anæsthetics	12. The differential calculus
13. Antiseptic surgery	13. The circulation of the blood discovered
14. Principle of conservation of energy established	14. Light proved to have finite velocity
15. Molecular theory of gases	15. The development of geometry
16. Velocity of light directly measured and earth's rotation experimentally shown	16. Gunpowder
17. The discovery of the uses of dust	17. Paper
18. Chemistry, definite proportions	18. Fire making
19. Meteors and the meteoritic theory	19. Tool making
20. The proof of glacial epochs	20. Agriculture
21. The proof of the antiquity of man	21. Domestication of animals
22. Organic evolution established	22. Metals and pottery
23. Cell theory and embryology	
24. Germ theory of disease	

[1] The chart is adapted by permission from Wallace, *The Wonderful Century*, (Dodd, Mead and Company).

per minute, shrinks at the beginning of the century into an insignificant prototype. We lose all planing and woodworking machinery, and with it the endless variety of sashes, doors, blinds, and furniture in unlimited variety. There are no gas engines, no passenger elevators, no asphalt pavement, no steam fire engine, no triple-expansion steam engine, no celluloid articles, no barbed fences, no time locks for safes, no self-binding harvesters, no oil or gas wells, no ice machines, or cold storage. We lose air engines, stem-winding watches, cash registers and cash carriers, the great suspension bridges, the great tunnels, the Suez Canal, iron-frame buildings, iron-clad war vessels, revolvers, torpedoes, magazine guns, machine guns, linotype machines, all practical typewriters, all Pasteurizing, knowledge of microbes or disease germs, sanitary plumbing, water gas, soda-water fountains, air brakes, coal-tar dyes and medicines, nitroglycerine, dynamite and guncotton, dynamo electric machines, aluminum ware, electric locomotives, Bessemer steel with its wonderful developments, ocean cables, enameled iron ware, Welsbach gas burners, electric-storage batteries, the cigarette machine, hydraulic dredges, roller mills, patent-process flour, tin-can machines, car couplings, compressed-air drills, sleeping cars, the dynamite gun, the McKay shoe machine, the circular-knitting machine, the Jacquard loom, wood pulp for paper, fire alarms, the use of anæsthetics in surgery, oleomargarine, street sweepers, Artesian wells, friction matches, steam hammers, electroplating, nail machines, false teeth, artificial limbs and eyes, the spectroscope, the moving pictures, acetylene gas, X-ray apparatus, automobiles, and — but, enough! the reader exclaims, and indeed it is not pleasant to contemplate the loss. We shrink from the thought of what it

would mean to live without access to the progress of the last century."[1]

And what of the future?

We are creatures of the twilight. — "Everything seems pointing to the belief that we are entering upon a progress that will go on, with an ever more confident stride, forever. We are in the beginning of the greatest change that humanity has ever undergone. There is no shock, no epoch-making incident — but then there is no shock at a cloudy daybreak. At no point can we say, 'Here it commences, now; last minute was night and this is morning,' but insensibly we are in the day.

"It is possible to believe that all the past is but the beginning, and that all that has been is but the twilight of the dawn. It is possible to believe that all that the human mind has ever accomplished is but the dream before the awakening. We can not see, there is no need for us to see, what this world will be like when the day has fully come. We are creatures of the twilight. But out of our race and lineage minds will spring, that will reach back to us in our littleness to know us better than we know ourselves, and that will reach forward fearlessly to know this future that defeats our eyes. A day will come, one day in the unending succession of days, when beings shall stand upon this earth, as one stands upon a footstool, and shall laugh and reach out their hands amidst the stars."[2]

[1] Adapted from Byrn, *Progress of Invention in the Nineteenth Century*, (Scientific American).

[2] A. S. Cushman, *Chemistry and Civilization*, pp. 130–32, (E. P. Dutton and Company).

Problems

1. Define or explain: (use the dictionary if necessary)

Rule of thumb	A scientific attitude of mind
Trial and error	Research
Scientific law	Technology
Bacteria	Chemical elements
Antiseptic	Personal hygiene

2. What has been done in your own town to keep the streets and roads clean? What still remains to be done in order to improve the conditions in your town?

3. Some persons do not like to have their houses placarded when there is a case of scarlet fever in the house. Are they in the right about that? Is the card put there to punish them?

4. How does your family dispose of garbage? Why is it wise to spend money on the proper removal of garbage? When the city removes garbage, how does it get the money with which to pay the cost of doing the work?

5. From what source does milk come to your house each day? What precautions do the public health authorities take with regard to the milk?

6. What are some of the ways by which the family can add to the precautions taken by the public in regard to food?

7. Make a list of the things done in your school to safeguard health. Do you include gymnasium work? Good light and air?

8. "Man's command over metals and power makes possible the water supply of the modern city." Explain.

9. Could some plague which might start in California spread to other parts of the country more readily to-day than it could fifty years ago? How do we prevent any such spread?

10. "The United States should be interested in health conditions in South America." Why or why not?

11. "The railroad is a great menace to public health and no one should ride on the railroad." How can you answer this argument?

12. "Modern medical activities are based on scientific laws." Illustrate.

13. What services does chemistry render for our living together well? Write out an argument for your taking chemistry in school.

14. Watch yourself as you work in some science-class laboratory. Do you measure carefully? Do you record what happens? Do you test out laws of science?

15. "Man's power to communicate made possible the development of science." Is this true?

16. One great teacher said, "One of the most important things in the world is curiosity. It should be encouraged in our schools." Why did he say that?

17. Name some debts that modern science owes to early man.

18. Write out a paragraph giving the best reasons you can why school authorities provide training in arithmetic.

19. "Magic" is the explanation which primitive man gives for unusual happenings. "There must be some law here which I do not yet know," says the modern scientist when he sees an unusual happening. Which one is more likely to believe that unusual happenings are worth studying and can be made usual and ordinary?

20. Draw up a list of superstitions of to-day which go back to the days of magic. Here is a start: "Breaking a looking glass means seven years of bad luck." "Turn back when a black cat crosses your path."

21. "Science knocks superstitions and silly fears out of our heads by showing us that nature acts according to laws." Do you agree?

22. Write out a paragraph giving reasons why a scientific attitude of mind is worth having.

23. Are any measurements used in your kitchen? Are standards of measurement important when buying vegetables or fruits? Do you suppose a city might wisely have a department to test the scales and other measuring devices of retail stores such as groceries?

24. Does science have anything to do with the ordinary affairs of your home? Does your mother make use of it in any way? Do you? Is your house built according to rules of action growing out of science?

25. Does science have anything to do in giving you health? In giving you recreation? Education? Means of making a living?

26. In what ways has the microscope been of service to man?

27. Some wealthy persons think that one of the very best ways they can use their money is to give it to institutions that will spend it in research. Is this good sense?

28. How do you account for the fact that Wallace's list of striking steps in progress (see page 169) is as long for the nineteenth century as for all the earlier centuries?

29. "Science is the creative stage of man's harnessing of nature." Explain.

30. Answer the questions at the beginning of the chapter, page 141.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter V.

1. Louis Pasteur (a modest scientist confers untold benefits upon mankind).
2. The Measurement of Time (the calendar, the sundial, the water clock, the hourglass, the clock, the watch, the chronometer, and observatory time).
3. Our Measuring Devices or Standards (how standards help us: the work of the bureau of standards).

See also:

Chapter III, 4. Harnessing Rays of Light (what the lens has meant for living well).

Chapter IV, 3. Thomas Alva Edison (a glimpse of an inventor at work).

Chapter VI, 1. The Conquest of Yellow Fever (how science has removed one of man's greatest dangers).

Chapter XVII, 2. Michael Faraday (an example of devotion to scientific truth).

Chapter XVII, 4. Howard Taylor Ricketts (an example of devotion to the ideal of service).

Problems to think over are given in these reading selections.

CHAPTER VI

HARNESSING NATURE AND LIVING TOGETHER WELL

Questions to Keep in Mind while Reading This Chapter

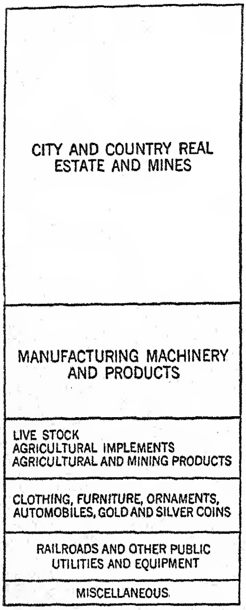
1. Are we living together as well as we should?
2. Upon what does it depend whether we shall live together well?

A. Some General Statements about Living Together Well

(Are we living as well as we should?)

As we think back over man's really wonderful achievements in harnessing fire, metals, power, and machines, and as we reflect how much these and scientific knowledge have increased our powers, we might expect to be living together in almost an ideal way. This, however, is far from being the case. We have to-day no very great surplus of the good things of life. Scarcity and famine have not been banished from the earth; they are only half a step behind us in our upward climb. Even the small surplus that we have is shared in such a way that some of us have much and others of us have little; poverty and the fear of poverty are very

real things for great numbers of us. Then, too, there are millions of us who are or have been in bad health quite unnecessarily. There are millions who have not shared in the store of acquired knowledge in such a way as to enable them to do their best work for themselves or for society.



How Our Wealth Is Made Up

These are serious statements. Are they true statements? If they are true, can anything be done about the matter?

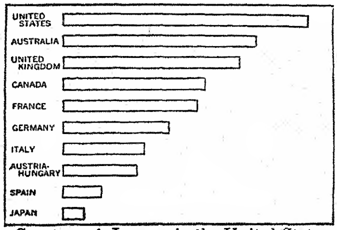
The surplus of good things is neither great nor rapidly growing.—*Our wealth.*—As far as the good things of life are concerned, we are the most fortunate people in the world, for, on the average, we have more wealth than the people of any other nation. When measured in dollars the total seems very large. In 1919 it was $294,145,000,000, a sum so large that the figures mean nothing to us. If, however, we divide this enormous total by the number of people there were in the United States in 1919, we find that the result does not look so impressive. It gives us an average wealth (we call this per capita wealth) of only $2750. This $2750 does not represent what we get each year; it represents *all we have.*[1]

The diagram shows what is contained in this wealth of ours. Half of it is real estate and mines. The other half is made up of railroads, waterworks, telephone and telegraph equipment, live stock, machinery, manufactured goods, agri-

[1] Several of the wealth and income charts are based on King, *The Wealth and Income of the People of the United States.* (The Macmillan Company.)

cultural commodities, clothing, furniture, precious metals, etc. One writer calls our wealth "the materials of civilization."

Our income. — Thus far we have talked of our total *wealth*. Now let us talk of our *income* — of the amount of goods which becomes available for us to use every year. This is the yearly product or yield of our agriculture, our mining, our manufacturing, our transportation, our banking, our teaching, our medical work, and all the other varied activities of this complex life of ours. (The work of the housewife in running her household is, however, not included in these figures.)

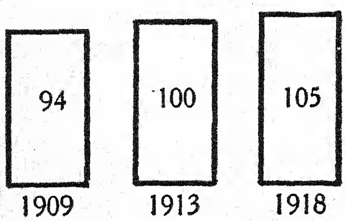


Courtesy of: Income in the United States (National Bureau of Economic Research)

PER CAPITA INCOME OF VARIOUS PEOPLES

The length of the rectangles gives a basis of comparison. The United States is easily in the lead.

As regards income, also, we are the most fortunate people of the world. The diagram above shows clearly that we are much more fortunate than any other group. We are more fortunate, even, than the other English-speaking nations. But even so, our annual income is not enormous. It amounted to only $586 per capita for the year 1918. This income, too, is growing rather slowly as the chart to the left shows.



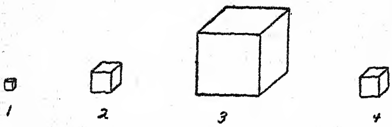
HOW OUR PER CAPITA INCOME IS GROWING

When we represent the per capita income of 1913 by the figure 100, the figure 105 represents our income for the year 1918 and the figure 94 represents what the situation was in 1909.

Fortunate as we are in the United States, it is quite clear that our surplus of good things is not great, and it is not increasing as rapidly as we should like.

Our wealth and income are in relatively few hands. — All of us know quite well that the good things of this world are

not evenly divided. We talk of the rich, of the well-to-do, of the middle class, of the poor, and of other groups of our society. These words have no exact meaning. It is, however, clear that about one fiftieth of our people own more than half of our wealth, whereas almost two thirds of our people own only one twentieth of our wealth. When we remember that our total wealth is not enormous, it becomes plain that a good many of us are not in a very fortunate situation.



HOW OUR WEALTH IS DISTRIBUTED

No. 1 shows the wealth of the average poor family (65% of our population). No. 2 shows the wealth of the average middle-class family (33% of our population). No. 3 shows the wealth of the average rich family (2% of our population). No. 4 shows the wealth each family would have if our wealth were evenly distributed.

Our annual income is more evenly divided than is our wealth. But here, also, a great many persons are not in a very favorable situation. We do not have full and exact figures of income for our people. The figures below for the year 1918 must be regarded as our best estimate. They show that about one fifth of the income receivers took about one half of the income, leaving the remaining half of the income to be divided among four times as many persons. And we must remember that the total income was disappointingly small.

HOW THOSE WHO RECEIVED PERSONAL INCOME IN 1918 WERE GROUPED

(37,569,000 PERSONS)

The most prosperous	1% took 14%	of the total income
The most prosperous	5% took 26%	of the total income
The most prosperous	10% took 35%	of the total income
The most prosperous	20% took 47%	of the total income
The remaining	80% took 53%	of the total income

Many of our people live in poverty or the fear of poverty. — Just what do these figures mean? They mean that there are in the United States to-day great numbers of people "who are poor in the sense that they are not properly fed, clothed, sheltered; people who from birth have less than enough of these absolute necessities; who, in the

main, toil long and hard for even the amount that they do have; who toil in more or less constant fear that even this small amount may fail them."[1] A few years ago a careful student estimated that in some parts of our country as much as 20% of the population had too little of even the bare necessities of life. He estimated that in the United States as a whole, in even fairly prosperous years, there were as many as ten million persons who were in poverty. The worst of it is that these people who are poor are always in danger of falling to an even worse position. They live on the edge of a precipice of want and suffering.

When such things are true (and they *are* true), we have no right to be too proud of what we have accomplished. We have no right to feel that we have solved the problem of living together well. We have no right to feel, either, that there is some easy solution, such as that of dividing up our goods evenly. One trouble with that solution is that there is no great surplus to divide!

Our physical well-being is far from satisfactory. — Of course there is very much more to this life of ours than food, clothing, and shelter; very much more even than these necessities plus music, art, recreation, and the comforts and luxuries of life. We might have all these things and still be miserable if we were in poor health in either body or mind. Now, the truth is that we have made but the merest beginning of living together well as far as health is concerned. This country alone has 40,000 persons who are totally deaf; 53,000 who are totally blind; 74,000 who are insane; 25,000 who are killed every year in industry; and 800,000 who are hurt so severely that they are out of work for four weeks or more. Epidemics are still far too common.

[1] Cf. J. H. Hollander, *The Abolition of Poverty*, pp. 1–8. (Houghton Mifflin Co.)

In this chapter we shall study five great factors in living together well. — We have looked at only a few examples of our ill-living. But those examples are convincing. Clearly, we are so far from living together really well that it is worth while to think about the matter very seriously. Accordingly, one of the things that we shall do in this book is to build up a list of general statements about how to live together well. We cannot make a complete list at this time. We can only make a start, by putting down now the statements growing out of our work up to the present time. We shall add to the list in Parts III, IV, and V.

At this time we can make five statements.

1. **How well we shall live together depends upon the natural resources that are available.**
2. **How well we shall live together depends upon the scientific knowledge that is available.**
3. **How well we shall live together depends upon the capital goods (tools, machines, materials, etc.) that are available.**
4. **How well we shall live together depends upon the human resources that are available.**
5. **How well we shall live together depends upon whether we use our natural resources, our capital goods, our scientific knowledge, and our human resources for better living or for evil living.**

B. Natural Resources and Living Together Well

(How well we shall live together depends upon the natural resources that are available.)

We have not used this term, "natural resources" often although we have talked a great deal about the things it includes. It includes, among others, such matters as rainfall, soil, climate, water power, beds of iron ore, veins of coal, winds — in brief those goods and forces that Mother Nature freely gives to us.

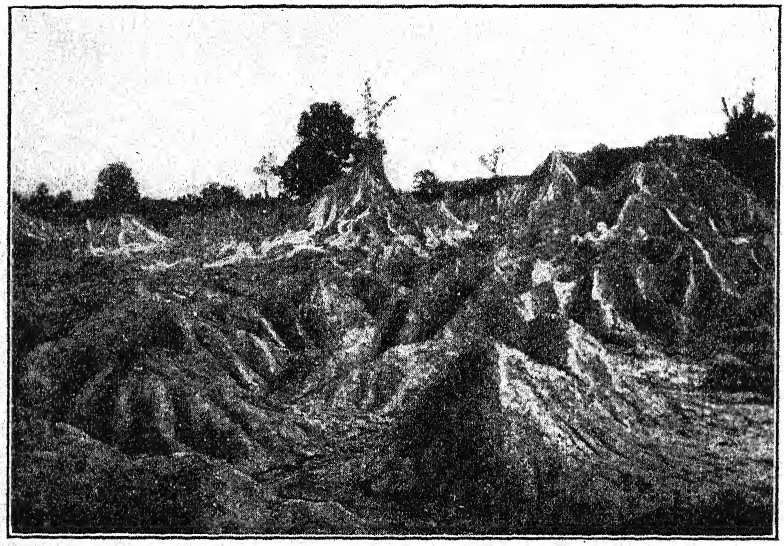
Good natural resources are absolutely vital to living together well. — We need only to look at such a list to realize

that man is absolutely dependent upon nature. Nature gives us the basis for everything we use and everything we do. We saw that the Iroquois were helped in their hunting, fishing, agriculture, tool making, and house building by the fact that they were living in a very favorable environment. We know that nomads (people who live by means of their herds and drive them about from pasture to pasture) are largely dependent upon nature; that they are "creatures of their environment." It is true that, as man grows in his power to harness nature, he becomes more able to *command* his environment. He transports goods from one place to another; he builds houses to protect himself from the rough climate; he provides clothing for the same purpose. Nevertheless, even in our own living together (and we have learned to command nature in many ways) beds of iron ore, veins of coal, good soils, and good climates are very important. Other things being equal, the more abundant nature is, the better we shall live together.

Civilized man makes heavy drains upon natural resources. — As matters are to-day, we should be careful to use our natural resources well. The geologist Shaler has pointed out that the lower animals and primitive man make no drain on nature's stores that she does not, herself, replace. The primitive man, who merely appropriates such gifts of nature as nuts and fruits, does not diminish the amount that will be available the next year or the next century.

Civilized man is, however, a spoiler. He tills or cultivates the ground. When he does this, he tears away the protecting carpet of grass from the field, and a single heavy rainstorm may carry away an inch of fertile soil from some hillside. This is more than would be carried away in five hundred years in the appropriative period of man's food getting. So, also, civilized man raids the forests for lumber.

Even when we do our lumbering properly, we use up our forests faster than nature grows them. When we do our lumbering improperly, the rains no longer soak gently down into the earth. They tear out gulleys, wash away the fertile soil, rush rapidly down into rivers, and cause the floods that we so frequently read about in our newspapers.



IMPROPER LUMBERING

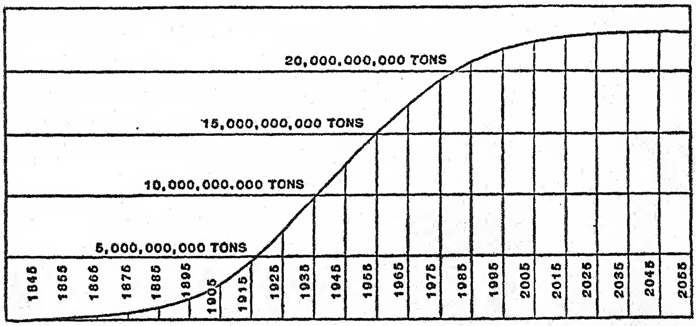
All trees were cut from this land and the rains are washing the soil away and making deep gullies.

Again, man's drain upon iron ores to-day is so great that there is probably ahead of us a time when we shall again need to use iron sparingly. Perhaps we shall have to substitute other metals, such as aluminum.

Some possibilities in the use of our power resources. — We have looked at merely a few examples of the drains civilized man makes upon natural resources. But even these few examples are more than we shall have time to study

in detail. We must choose some one case. Since man's mastery of power is one of his most important achievements (see Chapter IV), let us choose for study those natural resources from which we secure our power.

Coal. — Our greatest source of power to-day is coal. This coal is stored sunshine of thousands of years ago! The sun enables plants to grow. Every day the earth's plants absorb thousands of tons of carbon from the air. When they



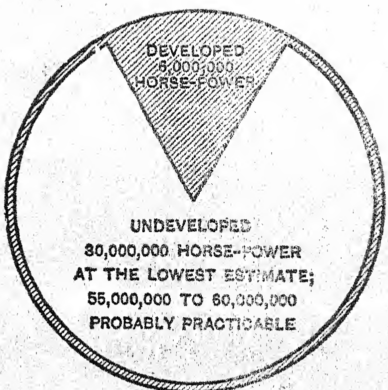
ESTIMATED PRODUCTION (TONS) OF COAL IN THE UNITED STATES TO THE YEAR 2055, BY DECADES ENDING IN THE YEARS CITED

Notice how recently we have begun to consume coal on any considerable scale and how rapidly we are increasing that consumption.

decay, they give this carbon back to the air. If, however, a mass of plants should become covered by water, most of the carbon would not get back to the air but would be held in the plants. Suppose that this mass should become covered by layers of sediment. Pressure and heat would, through long ages, change it into peat, into lignite or brown coal, into bituminous coal, and into anthracite coal. In the long-, long-ago world there were a few spots where just the right combination of great masses of plants, water, pressure, and heat made possible the veins or beds of coal which we use to-day. There are, of course, only a certain number of

such veins, and nature would need ages to make new veins. When we use a ton of coal, therefore, we diminish by that much our supply of coal.

We have, scattered about in various places in the United States, a stock of coal that would make a mountain 18 miles long, 18 miles high and 18 miles wide, and we have mined less than 1% of the original amount. We are, however, using our coal more and more rapidly. Furthermore, many veins of this coal are not very accessible, and many other veins are of quite poor quality. To make a long story short, the end of our coal supply is clearly in sight within the next few centuries. This is true both of the United States and of the other countries. If we think of man's future in the light of his long past, we see that our coal is a very temporary power resource. It will be used up. If we are to live together well through the coming centuries, we must some day find other power resources.



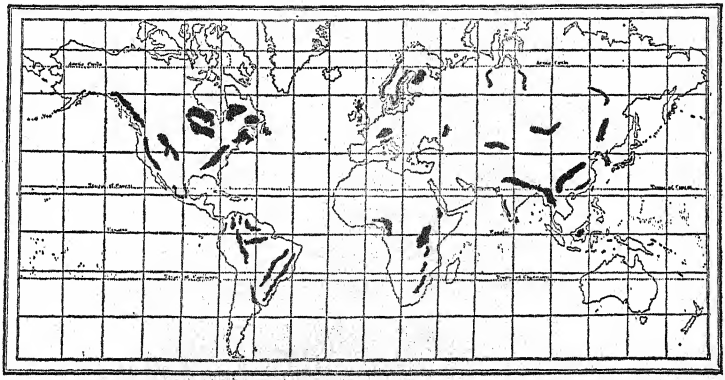
WATER POWER IN THE UNITED STATES IN 1909

Clearly we have only begun to develop our water power—our "white coal" as it is called.

Petroleum and natural gas. — We shall not find sufficient power resources in the other fuels of to-day, petroleum and natural gas. Their supply is even more limited than that of coal. As far as that part of our petroleum which flows from wells is concerned there is a supply for only a short period of years. It is true that there are great quantities of petroleum, which can be "manufactured" out of our shales. But as things are to-day, this "manufacture" of petroleum is an

expensive process. The fuel thus obtained would be an expensive source of power.

Water power has long been a servant of man. With our modern ability to convert a fall of water into electricity and to carry the electricity many miles, there is little question that the time will come when water power will be more useful to us than our waning coal supply. Our water power



THE WATER-POWER AREAS OF THE WORLD

The black spots show the areas where conditions are such as to make development of water power possible. The Americans are especially fortunate.

does not diminish through use, for it is continually being replaced by nature's rains.

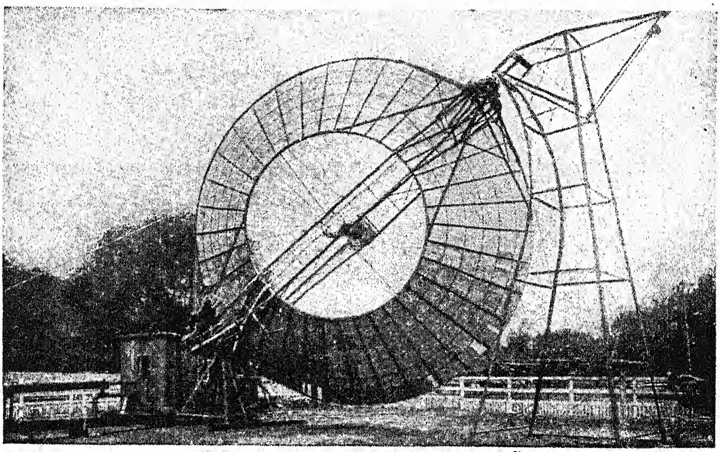
It must be remembered, however, that water power can not be developed everywhere. We can have good water power only in those regions where there is good snowfall or rainfall; where the flow of water is regular or can be made regular by making reservoirs; where the height above sea level is sufficiently great to get a "fall" as the water returns to the seas; where the surface conditions (topography) are such as to concentrate this fall at one point or at a few points, so as to be of service. The map shows that these

areas are neither very numerous nor very large, and some of them, as the world's population is distributed to-day, are located at points which cannot serve many people. A shifting to water power will probably mean considerable shifting of population also.

Tides and ocean waves. — Valuable as our water resources are, there can be no question that, as our coal and oil wane, we shall have to turn to other powers. One power that man has long dreamed of using is the tides. There is here perfectly enormous power — power that would suffice for any thinkable population on this earth. But how to utilize it is the problem. There have been and still are on ocean coasts a few "tide mills" which catch the water in such a way as to make it turn wheels as in an ordinary waterfall. The tides are, however, not continuous. They do not even come at the same hour every day. It follows that any large use of tidal power must apparently be in connection with storage batteries and must wait for some plan which we cannot yet picture of providing "harness" at the shore lines. The same remark can be made of any possible utilization of the waves of the sea. We do not *now* see how to utilize these ocean powers on any large scale, but it is possible that we shall find some way to use these powers later, when the scarcity of coal begins to pinch.

Plants. — We have a power resource, too in our plant life. Only to a slight extent will this come from burning the wood of our forests. That amount will not go far and it will be needed for other purposes. We shall perhaps get power through the ability of our chemists to procure alcohol and vegetable oils from our plant life. How great use will be made of such power resources in later centuries we have, of course, no means of telling at this time. We dream of finding here quite considerable resources.

The sun's rays. — We also dream of using the sun's rays. A few "solar engines" which catch the sun's rays and turn them into mechanical horsepower are already in existence. Up to the present time, however, we have not been able to make solar engines that can compete with the coal-heated steam engines. Perhaps we may be able to do so in the future, but here again the areas in which we can have steady,



Courtesy of The Americana

ONE TYPE OF SOLAR ENGINE

The engine is mainly a big reflector to catch the sun's rays. It is expensive to build in proportion to its power, and it is not easy to protect from the wind.

intense, dependable heat for such purposes are so located as not to serve great masses of the world's present population. Of course, the hot deserts are the places of dependable sun's heat, but these are poor places in which to live.

The winds. — Very likely we shall depend upon the winds more in the future than we do to-day. They are, of course, uncertain. Not until they have been harnessed up with some storage-battery device will they be a dependable servant. However, as coal becomes dearer, it will not be surprising if man harnesses the winds more effectively.

We must use our natural resources wisely. — Our civilization is a civilization that is built upon power. What we have seen of our power resources is enough to disquiet us concerning the possibility of our living together well in a far distant future, unless we become able to command power resources not being used to-day.

It should be remembered that we have been discussing power as just one example of our use of nature's gifts. Nature's gifts, such as our power resources, our forests, our soils, and our metals, are not so abundant that we dare be careless in our use of them. We should "conserve" them. That means *we should use them wisely.*

C. Science and Living Together Well

(How well we shall live together depends upon the scientific knowledge that is available.)

We make the best use of our natural resources and our other goods only through scientific knowledge. Indeed, as we saw in the last chapter, the spread of scientific knowledge is mainly responsible for the great outburst of invention in the last sixty years. Scientific knowledge is our greatest aid in wringing nature's secrets from her and in making them available for man's use.

We can get some idea of what acquired knowledge means to us to-day by remembering how meagerly the 15,000 Iroquois lived and then realizing how much better 15,000 of us would live if we were to move into just such a territory, taking with us our modern libraries, scientists, schools of technology, and perhaps enough "capital goods" to make a start. There can be no doubt what would happen. Fifteen million of us could live in that territory many, many times better than the 15,000 Iroquois lived, and 15,000,000 is a thousand times 15,000. That gives us some measure of the

progress we have made. For much of that progress we may thank acquired knowledge.

What will be the future of science. — What may we expect to happen in the future as far as our scientific knowledge is concerned? Will it continue to grow as it has grown in the past and especially as it has grown during the last century, or will our science cease to grow? It is well for us to remember that in ancient Egypt scientific knowledge grew for a time and then declined; that in the wonderful nursery of science, ancient Greece, it flourished for three centuries and then declined; that in Alexandria it flourished for a century and then shrank; that among the Arabs a period of progress was followed by a decline. Will history repeat itself with us? That is a possibility.

Our science is widespread. — While it is possible that our scientific knowledge may cease to grow, there are good reasons why it is not at all probable this will happen. It is probable, indeed, that our scientific knowledge will grow faster and faster. For one thing, our science is much more widespread than earlier science was. Earlier science was in little pockets of the earth's surface — in Egypt or in Greece or among the Arabs. Our science is spread over many nations. This makes it much less probable that any catastrophe (such as a war) can harm the science of to-day as seriously as catastrophes injured science in these earlier pockets.

In addition to our science being spread over many nations, it is also much more widely spread among the people of those nations. After all, those who had any chance to get scientific knowledge among the Egyptians, the Greeks, and the Arabs were few and far between; only a small part of those populations had a chance even to learn to read and write. The situation is very different to-day, as the chart on

page 166 shows. To-day we number our scientists by the thousands. We number by the millions the persons who have a chance to become scientists because they have a chance to learn to read and write.

Surely, with science so widespread over the earth's surface and so widely understood by the persons living on the earth, it is not probable that our scientific knowledge will be wiped out. It is not even likely to have to pass through any such period of eclipse as did European science during the dark ages before the great awakening (see page 164).

> Schenectady. N. Y., Aug. 19.—[Special.]—Dr. Charles P. Steinmetz, the electrical wizard, known the world over, believes that at the rate we are traveling the world is making gigantic strides by leaps and bounds
>
> **1923 to Be Primitive in 2023.**
>
> The wizard visualizes an amazing transformation in life in 2023.
>
> When another century has rolled into history people will be amazed at our helplessness in our struggle for advancement, more so than we are in looking back on the almost primitive days when the steamboat made its first appearance on the Hudson river.
>
> **Will Have Spotless Nation.**
>
> Palls of smoke will no longer hang over cities, streets will be free of refuse, people will be healthier in the centers of population, and every city will be a "spotless town." That is to be the work of electricity, also.
>
> Steinmetz sees all these things and hundreds of others that even he, with his remarkable insight into the workings of science, does not feel sure in speculating on.

Our science is sturdy. — And our science, which is so widespread, is much more vital and sturdy than was the science of earlier peoples. To begin with, we are more curious and inquiring than any of these earlier peoples, with the possible exception of the Greeks. Curiosity is one great foundation stone of scientific knowledge.

Then too, we are far better equipped for carrying on scientific study than any group of people in the past. Measuring devices are another great foundation stone of scientific knowledge, and we have certainly developed measuring devices of more kinds and of greater fineness than were ever dreamed of by earlier scientists.

We have built up, too, a wonderful group of agencies or institutions designed to keep our science growing. Our schools steadily spread scientific knowledge; our printing devices do the same through books and newspapers; our transportation and communication enable the scientist in

one part of the world to have access to the scientific knowledge of all the rest of the world. Our universities and our business houses have built up research agencies the goal of which is that of "extending the bounds of knowledge."

Motives to increase science. — The wide spread of our science, then, makes its position secure, and our measuring devices and institutional life make it vital and sturdy. In addition, we have strong motives to increase our scientific knowledge. We have learned how useful science is in the service of man — how much it helps us to harness nature and how important it may be in our living together well. This vision of what science may mean has begun to appeal to the best that is in us: to our ideals. The service of science may, indeed, call for heroes. Science has had its heroes, who have even laid down their lives that yellow fever and typhus and other scourges of man might be conquered.

Dr. Jesse W. Lazear
This man laid down his life to help save the rest of us from yellow fever.

Quite aside from this heroism, there is a spirit of adventure in serving science; there is a challenge even to the most gifted imagination. What could be more interesting and more challenging than the attempt to understand how this world of ours is put together? It is not surprising that all of us have come to feel that the servants of science are worthy of honor and esteem; that the work of science is worthy of support by taxes and gifts; that each of us has a privilege, an opportunity, and a duty in mastering the

knowledge that has been acquired and in extending its boundaries.

A dream of the creative possibilities of science. — Let us now tie up this discussion of the future of scientific knowledge with the discussion of the future of our natural resources and especially with the future of power. We saw that our civilization is built on power, and that as far as our present power devices are concerned, the time may come when our civilization will be in danger. Can the scientists come to our rescue? There can be little doubt that our scientists will steadily improve our existing powers. Will they be able to harness powers of which we are not dreaming to-day? Of course, no one can answer such a question as that and be certain that his answer is correct. However, since we all like to wonder about things that may happen, and since the things our scientists have already done are quite as wonderful as any of the stories we read in the *Arabian Nights*, let us see what it would mean if our scientists should, some day, learn to harness the atom and make it work for us.

The molecule. — We know that everything, whether solid, liquid, or gas, is made up of little particles that we call molecules. These molecules, even in solids, are always in violent motion, rushing about, colliding, and rebounding in every direction. Pull a coin out of your pocket and look at it. It seems very quiet. As a matter of fact, there are in it trillions of molecules dashing about. The coin is just one huge reservoir of energy. Or, notice the air on a still day. There seems to be no motion in it; yet each molecule in that air is dashing about at a rate faster than that of a rifle bullet and is colliding about five billion times a second with other molecules. These molecules are so exceedingly small that it would take more than a hundred million of them side by side to reach an inch. This does not mean much to us until

we remember that that number is about as large as the population of the United States to-day. As many persons as that, placed side by side, would reach around the world.[1]

The atom and electrons. — Now these molecules, small as they are, are made up of atoms that are much smaller. You can get an idea how small these atoms are by remembering that if a little bubble of gas the size of an ordinary pin head were made as large as the world is to-day, its atoms would then be the size of tennis balls. But these atoms are made up of even smaller things. Atoms are made up of electrons, "particles" of electricity, centering about a "nucleus." If an atom that we talked about above were made the size of St. Paul's Cathedral, each electron in it would be about the size of a small bullet.

By carrying further the statements on page 155 we can see this story of electrons more clearly. Just as

words are made up of syllables, which are made up of letters,

which are made up of curves and straight lines,

so

substances are made up of molecules, which are made up of atoms,

which are made up of electrons around a nucleus

And now we come to the power story. In most substances the electrons are being held together in the incessantly active atom, but it is possible to cause the atom to break up and shoot out electrons. That is what is happening in radium all the time. These electrons are shot out of atoms at a speed which may approach 160,000 miles per second. One writer has calculated that it would take 1,340,000 barrels

[1] These paragraphs are adapted from Thomson, *The Outline of Science.* (G. P. Putnam's Sons.) The original phraseology is followed in part.

of powder to give a bullet the speed of one of these electrons. He says that a small copper coin contains energy equal to eighty million horsepower. A few pounds of matter contain more energy than we can to-day extract from millions of tons of coal. Half a brick contains as much energy as we now get from a small coal field. Every breath we draw contains enough energy in the atoms of the air to drive the wheels of the workshops of the world.

Harnessing the atom. — Will science ever tap this enormous energy? Some scientists believe that the day will come when we shall be able to harness and to utilize atomic energy. No one knows when this will happen; it may be a thousand years; it may be done to-morrow; though undoubtedly it will take a fairly long time to develop power machines that can make use of such forces. It took us several generations, you will remember, to develop effective steam engines. The devices that will be necessary to use atomic energy, will, of course, be much more complex and much more difficult to develop. It may be that we shall never find ways to release atomic energy except at a cost greater than the energy is worth.

One thing is certain: if we ever do learn to harness atomic energy and to harness it in any effective way, the result will be a new world to live in. We have seen that the harnessing of metals and of steam and gas and electric power have made our world very different from the world in which people lived before this harnessing occurred. These devices made it possible for us to use natural powers and thus to multiply our own powers. Now the natural powers concealed in the atom are much greater than any natural powers we have yet harnessed. We can hardly think up appropriate illustrations to show the difference. We cannot even picture the situation. If this energy is harnessed and if this

natural power is only used wisely, it will mean enormous things for our living together well.

Science is not magic. — We must, however, keep our wits about us. Even if the atom is ever torn apart under such conditions that its power is harnessed, it will not all be clear gain any more than the blast furnace is all clear gain. There will be preliminary work to be done. We shall still build machines to build machines to build machines to make goods. We shall still need to be careful that our powers are used for good and not for evil purposes. We now know what science means and what magic means, and so the expression "we cannot live together well by magic" should convey to our minds this thought: we should not expect to be relieved of the necessity of work — hard work — of planning, of forethought, of being conscientious in our use of our abilities. There is no magical way of getting something for nothing in our effort to live together well. The way of science is not the way of magic. It is the way of orderly, painstaking effort.

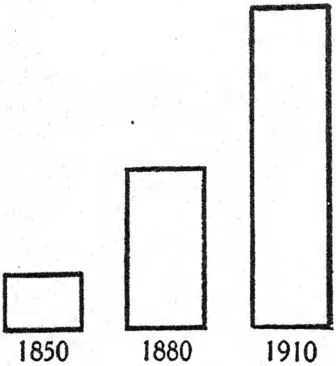
D. Capital Goods and Living Together Well

(How well we shall live together depends upon the capital goods—tools, machines, materials, etc.—that are available.)

"Capital goods" is a term we have not used in earlier chapters. It is the general term that economists (scientists who study man as he tries to get goods with which to gratify his wants) have hit upon to include blast furnaces, tools, engines, agricultural implements, domestic animals, factories, raw materials, and many other things which man works upon or works with.

At this time we need only to learn the term from the economist. We have already seen how true it is that man has come to use these capital goods more and more. Their

use in metal making, in power producing, and in food getting has made it a very different world to work in and to live in (see pages 100 and 132). Truly, how well we shall live together depends in large part upon the capital goods that are available.

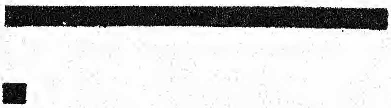


SIXTY YEARS OF INCREASE OF CAPITAL GOODS

There was in the United States in 1910 five times as much per capita of capital goods in fisheries, in livestock, machinery, tools, implements, railroads, business buildings, and improvements as there was in 1850. Notice that this is true per capita.

Our use of capital goods is not all clear gain. — There is no doubt that we have made real progress in this matter of capital goods. In the first place, we have many more of them than we had formerly, as the diagram shows. In the second place, the capital goods we have to-day are much better (more productive) than those of the past. We have seen many illustrations of this. Notice, too, the diagram below.

But we cannot rest on our oars in this matter of capital goods. It is very easy to be too hopeful over what has been accomplished; very easy to assume that our problems have largely been solved and that we do not need to work hard. This is very far, indeed, from being the case.



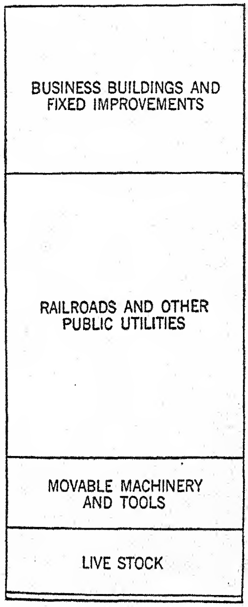
HOW MACHINERY HELPS IN WHEAT RAISING

The upper line represents the average time used by a farmer in raising a bushel of wheat 100 years ago. The lower line represents the average time taken now that he is using machinery.

Much preliminary work needed. — While it is entirely true that capital goods are very useful, we need to remember that all is not "clear gain" in our use of capital goods. It is true that a blast furnace is very productive of

iron; it will turn out as much iron per day as 200,000 of the toiling African savages mentioned on page 90. But that is not an entirely fair way to state the matter. These savages spent little time and energy in *getting ready* to make iron. They went at it *directly*. With us, however, there are vast quantities of preparation. We make engines, cars, cranes, ships, steel shovels, bricks, factories, and other capital goods for months and even for years before we get a single pound of iron from the furnace. All this preliminary work takes time and energy.

What is true of the blast furnace is true of every other form of capital goods. When we think how useful and how productive the modern machine is, we shall do well to remember the vast deal of preliminary work which we go through when we make machines to make machines to make machines to make machines to make consumers' goods for us. Only by remembering this can we get a fair idea how much such devices have contributed to our living together well.



OUR ACTIVE CAPITAL GOODS

The chart does not include raw materials, etc. It includes only those capital goods that act upon materials.

Much wear and tear. — Then, too, we need to keep in mind another cost. These capital goods wear out as they are used. They have to be replaced. Replacing them does not increase our powers; it merely keeps them what they were. Worse still, many capital goods rust out in idleness or are made useless by some new invention. As an illustration of the way they fade away,

take our great annual output of iron. You will remember that the figures were quite startling and gave the impression that we ought to live very well indeed (see page 95). The truth of the matter is that the annual wastage of our iron through rust alone is very great. One writer thinks that on the average we lose in this way about one fourth as much as we produce. Or take the machines in our factories. They wear out, they break, they become out of date, they are thrown out on the scrap heap. Our factory owners set aside every year out of their earnings a very considerable sum to repair and replace machines. This is just what we should wish them to do. The energy that is thus used in keeping up our stock of capital goods is, of course, used wisely. There can be no doubt, however, that it is a costly matter. Using capital goods is not all "clear gain."

Fields of use limited. — Then, too, in thinking how much our capital goods mean to us in our living together well, we need to remember that they are not equally important in every part of our life. We use them a great deal in transportation and in manufacturing. We use them somewhat less in agriculture. We do not make much use of them in painting pictures or in selling goods or in all such personal services as teaching, preaching, law, and medicine. In other words, these helpful devices are helpful mainly in certain parts of our living together.

What can we expect of the future as regards our capital goods? — Clearly, as far as our capital goods are concerned, the problem of living together well has by no means been solved. We have made great progress, but there is still an almost endless lot to do in improving our capital goods, increasing them, making them useful in new fields, and above all in making sure that we use them helpfully and justly. Even if we should harness the atom, these statements would

remain true. That explains why there is real point to what we hear to-day about the wisdom of preventing waste and about the wisdom of encouraging thrift. The householder who lets water faucets run unnecessarily, the boy who willfully breaks a street light, the Hallowe'en party that destroys property, the nation that unnecessarily uses up capital goods in carrying on wasteful wars — all these are using up energies of society to no useful purpose. Since wasted goods must be replaced before we can go forward, these persons are preventing, by just so much, our moving forward to a better living together.

How well we shall live together depends upon the capital goods that are available.

E. Human Resources and Living Together Well

(How well we shall live together depends upon the human resources that are available.)

It is very important that we should use wisely our natural resources, our acquired knowledge, and our capital goods. It is even more important that we should use ourselves wisely. Indeed, that is the main thing in living together well to-day.

The many forms of human waste. — It is so foolish to use unwisely our human resources, so foolish to waste *ourselves* that it seems almost impossible that such wastes should occur. They do occur, however, and they are enormous. The diagram on the next page gives some of the ways in which men go to waste.

We have no way of knowing what these wastes are costing us. We cannot even guess, for example, how much society loses because people are not well trained for their work. Everyone who has thought about the matter agrees that the sum is huge. We cannot even guess, either, how much

society loses because all of us, both the well trained and the poorly trained, make such poor use of our abilities. We do not work nearly as much as we are able to. Few of us, indeed, exert ourselves even to the point of helping to keep healthful and happy. We are like a piece of steel that we permit to rust away and disappear rather than use it enough to keep it bright and keen. Our scientists who have studied this matter (the psychologists) agree that most of us hardly tap the powers that are within us.

Some Forms of Human Waste [1]

- Men who go to waste
  - The idle
    - Involuntarily
      - The sick and injured
      - The unemployed
    - Voluntarily—The leisure class
  - The ineffectively occupied
    - Because of lack of training
    - Because of lack of opportunity
    - Because of lack of personal initiative and incentive
    - Because of weakened physical and mental power
    - Because of poor organization and direction of effort
  - The harmfully occupied
    - Wasting their own energy
      - In vice
      - In dissipation
    - Wasting the energy of other people
      - By crime
      - By fraud
      - By luxury
      - By false teaching
      - By bad direction of social energy

And then, as the diagram shows, there are the wastes due to dissipation and vice, to crime and fraud and false teaching, to weakened physical and mental power because of poverty or sickness; to the fact that a good many very able men and women are voluntarily idle. One writer has pointed out, as

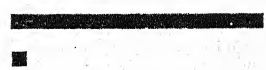
[1] Adapted by permission from Carver, *Principles of Political Economy*. (Ginn and Company.)

an illustration of this last waste, how much society loses in health and happiness when some great physician retires from his work just because he has become wealthy enough to retire. He is much needed by the community. Society loses his services when he retires.

Some of the wastes shown in the diagram can be stated in fairly definite amounts. Here, for example, are some samples of present-day losses due to unemployment and illness and accident in the United States alone:

2,500,000 persons, on the average, unemployed every day.
2,400,000 persons, on the average, ill every day.
$500,000,000 loss annually by deaths from tuberculosis.
$100,000,000 loss annually by illness from malaria.
$135,000,000 loss annually by illness from typhoid fever.
$250,000,000 loss annually by illness from hookworm.
$2,225,000,000 loss annually from accidents. Every six seconds somebody is injured while at work; somebody is killed every eight minutes.
$26,000,000,000 loss in this generation from shortened life because of tuberculosis alone.
25,000,000 have defective vision.

This list of examples could easily have been made four or five times as long, but even these few examples are startling enough when we remember that we could prevent 75% of such losses if we just made use of the knowledge we have to-day. An even larger percentage of these losses could be prevented in the future by increasing our scientific knowledge.



USING OUR POWERS EFFECTIVELY

The short line shows what we actually get done. The long line shows what we could get done if we used our powers effectively.

Even if we are not able to give any figure that tells the total of all the forms of human waste occurring in our country, we may be quite sure these losses are enormous. In dollars they must run into scores of billions per year. In misery and suffering and disappointments they simply cannot be

measured at all. It is easy to believe the writer who said that we are not making wise use of more than 20% of our human resources. Some persons have put the figure as low as 3%.

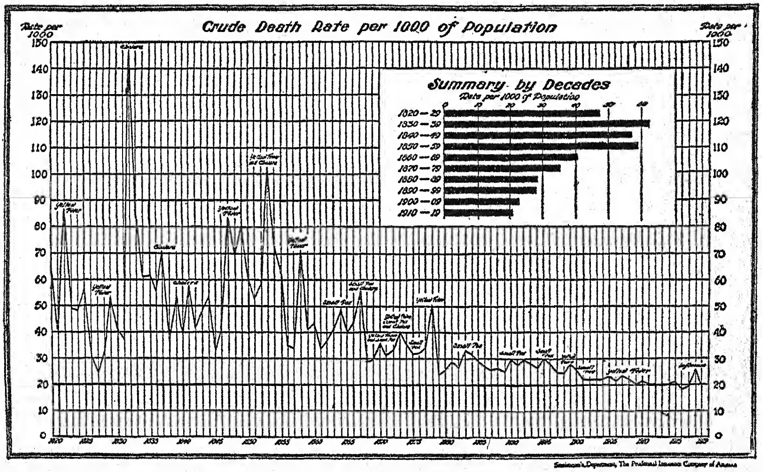
Fortunately we are doing much to conserve our human resources. — If we become gloomy when we think how we are wasting ourselves, it is at least encouraging to know that we are making very real progress at every one of the points mentioned in the diagram on page 200. If we made a complete list of all the gains we are making in conserving our human resources, it would almost be a list of all the things men are doing to-day to improve their living together. Although we cannot wisely try to make such a long list as that, we can see a few of the more important examples of what is being done.

Diminishing illness and accidents. — We have already seen that, thanks to the growth of medical knowledge and of institutions which turn that knowledge into rules of action, we are making great gains in diminishing illness. The diagram on the opposite page, showing how the death rate has declined in a hundred years in one of our cities, shows that progress is taking place. Similar progress has taken place in the last twenty-five years in our business houses where better medical attention and greater emphasis upon "Safety First" are reducing illness and accidents.

Diminishing unemployment. — So also we are doing many things to reduce the amount of unnecessary idleness. Better banking laws make our industries more secure so that failure in business does not throw so many men out of work. Better employment agencies (run by the Federal Government, by states, and by cities) let the workers know of jobs that are open. Employers in seasonal industries turn to manufacturing other products in slack times so that they

can use their workers the whole year around. Governments and business groups publish information about business needs. Labor unions help their members find employment. All these and many other methods are helping to reduce this particular form of human waste.

More effective employment. — There is almost no end to the list of agencies in our society that are trying to have



THE DECLINE IN THE NEW ORLEANS DEATH RATE, 1820–1920

What a saving in human life this reflects! Notice how much more effectively epidemics have been handled in the last generation.

persons more effectively employed. To mention only a few examples, our public schools and our business houses and our universities are working at the task of giving better training; our vocational-guidance work seeks to find better opportunities for us and to place us in tasks for which we are best fitted; our more progressive business houses select workers carefully and then train them and fit them into their jobs; our states pass minimum-wage laws, hoping thus to make sure that certain groups of our people get an

adequate living and do not become weakened nor poorly trained. And these are only a few examples of our efforts.

As for the wastes due to persons being harmfully employed, we have laws by which we try to control fraud and crime and vice. But we do not depend upon these laws merely. We try to develop public opinion that will be opposed to such harmful wastes. We try, through the church and the school, to give good ideals and desires to all our people.

Conserving Human Resources

By preventing accidents, by vocational guidance, by protecting machinery, and in hundreds of other ways we are conserving our human resources.

Clearly enough we have come to understand that it is important not to waste our human resources. The National Government, the state governments, the city governments are all working at the task of making conditions better in this field. Churches, schools, and business houses are working at it. Labor unions, employers' associations, women's clubs, and many other groups are working at it. Even you and I, by the mere fact of going to school, are working at it, for we are preparing to use ourselves more effectively.

If we wish to live together well, we must make wise use of our human resources.

F. Good Ideals and Living Together Well

(How well we shall live together depends upon whether we use our natural resources, our capital goods, our scientific knowledge, and our human resources for better living or for evil living.)

We must not make the mistake of supposing that if a people had good natural resources, good capital goods, good acquired knowledge, and good human resources, this people would be certain to live together well. Truly they ought thus to live; but they might not, and they would not unless they used all these things for good living and not for evil living.

It is easy to see that this is true. In wars, for example, we know that natural resources and capital goods and science and human beings are used in ways that cause misery and suffering. The same thing is, alas, true of times of peace. All of us have heard of land (which is a natural resource) being used for harmful amusements; capital goods being used to make harmful drugs; scientific knowledge being used to make others suffer and even to slay them. Human resources are so frequently misused that it is a common saying that there is no crook as dangerous as a skillful crook.

Clearly, neither natural resources nor capital goods nor science nor human resources are in themselves enough. They must be used with right motives and with just intentions. Since all of Part V is to be given to the study of "Man, the Idealist and Aspirer," we need not spend more time upon the topic at this place. It will be sufficient just now for us to remember that great powers may be used in evil ways.

We must use them for good purposes if we are to live together well.

Problems

1. Define or explain

Capital goods	Human resources
Consumers' goods	Natural resources
Per capita	Vocational guidance
Depreciation	Natural environment

2. Can we measure our wealth in any other way than in dollars? If measured in pounds, acres, etc., could we add it all up and say what the total was? Is money a measuring device?

3. What is the difference between wealth and income? Could a person with little wealth have a considerable income? What is the difference between total wealth and per-capita wealth?

4. If our total annual income were evenly divided among our people, could everyone "have his own automobile and servant"? How much would each person get? Is it important that more goods should be produced?

5. It has been said that if goods were evenly divided we could all live well and still not need to work more than one hour a day. Does that seem probable to you? Suppose that the statement were true, would it be better to work more hours a day anyhow?

6. Since man has already become a fairly good harnesser of nature, how do you account for the fact that our surplus of good things is somewhat limited? Do you think this surplus is likely to grow faster in the next fifty years than it has grown in the last fifty?

7. What does poverty mean to those who endure it? Build your answer around health, education, recreation, safety, hopefulness in life, effect upon children.

8. Does poverty harm only those who endure it or does it harm the rest of us also?

9. Name some natural resources which man is not likely to "use up." Is sunshine one? Is coal? Is the force of gravity? Is water power?

10. Suppose that we should wake up to-morrow morning and find that all the coal in the world had disappeared but that everything else was just as it had been before. What would we do about it?

11. Suppose that we should wake up to-morrow morning and find that all the finished iron in the world had disappeared but that iron ore still remained. What would we do about it?

12. "Coal is condensed sun's rays." What does this mean?

13. "Our civilization is built upon power." What does this mean?

14. There is to-day much talk of the wisdom of "conservation" of our natural resources. Does that mean refraining from using them or does it mean using them wisely?

15. Suppose that we should wake up to-morrow morning and find that all the iron ore in the world had disappeared. Picture the consequences.

16. The gross income of a certain factory was \$600,000 per year. The wage bill was \$300,000; the raw-materials bill, \$200,000; taxes, \$2500; interest on borrowed capital, \$30,000; depreciation was figured at 5% on a factory valued at \$400,000; the rest was profit. What was the amount of profit?

17. "Useless destruction of capital goods hinders our progress. Wise destruction of them helps it." Explain.

18. Suppose that we should wake up to-morrow morning and find that all acquired knowledge had disappeared. Picture the consequences.

19. Will science diminish, stand still, or grow in the future? Give your reasons.

20. What will happen if we harness the atom?

21. What arguments can you give for taxes to support public schools? To support research work in state universities?

22. Suppose a man had \$1,000,000 to give to some enterprise that would be helpful to man. He asks your advice about a wise way to give it. Confine your advice to enterprises connected with the five points on page 180.

23. Are human resources wasted in (*a*) the care of the sick; (*b*) the care of persons too young to work; (*c*) the care of persons too old to work; (*d*) compulsory school attendance; (*e*) premature death?

24. Name as many occupations as you can that are dangerous. Name as many as you can in which there is very little danger.

25. Several states have set up employment agencies. Do such institutions have any connection with the problems raised in this chapter? What is meant by calling unemployment a "waste of human resources"?

26. We hear much of vocational guidance. What bearing has vocational guidance on the matters raised in this chapter?

27. If all children over ten years of age were put to work, would more goods be turned out next year? Suppose this policy were kept up for twenty-five years. Would society have more goods on the twenty-sixth year than it would have had by having had the children continue in school until they were eighteen?

28. "We cannot live together well by magic." Grant that. How can we live together well? Does getting lessons well have anything to do with the matter?

29. "Without right ideals, all harnessing of nature is in vain—it is even harmful." What does this mean?

30. Do you picture man ever returning (the world over) to the state of neolithic man? Give reasons for your belief.

31. Answer the questions at the beginning of the chapter.

Interesting Reading

Marshall: *Readings in the Story of Human Progress,* Chapter VI.

1. The Conquest of Yellow Fever (how science has removed one of man's greatest dangers).
2. Petroleum and Its Uses (what one natural resource means to us: the need of conservation).
3. The Preservation of Foods (the origin and the benefits of canning, dehydration, and refrigeration).

See also:

Readings in the Story of Human Progress, Chapters III, IV, and V.

Problems to think over are given in these reading selections.

PART III

MAN, THE COMMUNICATOR: FURTHER MULTIPLICATION OF MAN'S POWERS

PURPOSES OF PART III

1. To show that communication is another of the great multipliers of man's powers.
2. To study the main forms of communication and how they have come to be what they are.
3. To show the significance of communication for our living together well and to give a glimpse of the future of communication.

CHAPTER HEADINGS OF PART III

A clever thinker once said that plants are "chemistry-binders." He meant that plants grow and develop because they are able to "bind" or control various chemical elements. "Animals," he said, "are also chemistry-binders. But they are more; they are space-binders. They are able to move about from place to place and thus aid their growth and development. As for man, he is a chemistry-binder, a space-binder, and also a time-binder. He is able to bind or control, for his growth and development, the experiences of times past and is able to plan for future times."

In Part III (Chapter VII to XI) we are to see that man's ability to communicate has made it possible for him to be a time-binder; has made it possible for him to build upon the progress of all past ages and to cast the lines of his thinking even out into the future. As we study the multiplication of man's powers of communication, let us remember that we are studying one of the main reasons why he has so greatly surpassed all other forms of life. He has surpassed the animals, for example, not merely in the fact that he is a time-binder. That power of his to build upon the progress of the past has made him the scientific harnesser of nature who has conquered distance—has become a space-binder — far beyond the powers of beast or bird.

CHAPTER VII

SIGN LANGUAGE, SPOKEN LANGUAGE, WRITTEN LANGUAGE, PRINTED LANGUAGE: MULTIPLIERS OF MAN'S POWERS

A. Spoken Language a Multiplier of Man's Powers
B. Multiplication of Powers through Writing
C. Multiplication of Powers through Printing

Questions to Keep in Mind while Reading This Chapter

1. In what ways has man increased his ability to communicate?
2. In what ways does communication multiply man's powers?

In the last four chapters we have seen how man has harnessed nature and made her do his bidding. He has learned to make and shape materials, control natural powers, increase his food supply, see things too small or too distant to be seen with the naked eye, improve his health — he has, in short, greatly multiplied his own rather puny physical powers. The record of what he has already done and the vision of what he seems likely to do in the future with these physical powers are nothing short of wonderful. We are now to see that he has done equally wonderful things in the realm of communication. This has meant still further multiplication of his powers.

The enormous extent of modern communication. — Each of us is swept by a continual flood of communication. The customs and wisdom of the past, the discoveries of the present, the hopes of the future pour in through written and spoken word, through music, painting, sculpture, and architecture. They pour in through the mails, newspapers,

magazines, books, and movies. "They come with the speed of radio pulsations or the crawl of the caravan." They are passed on by every group of which we are a member — the family, the church, the school, the club, the business house. We make contacts with others through trade and transportation, using the pack train, the railroad, the steamship, and the airplane. Our waking hours are spent in a never-ending sea of communication.

We are to study this sea of communication in the next five chapters.

A. Spoken Language a Multiplier of Man's Powers

(Gesture language; the origins of speech; how languages change; what speech means to us.)

Gesture language, an early form of communication, is still much used. — We do not know whether there ever was a time when man could not speak. We probably never shall know. We can, however, be perfectly certain of one thing. Primitive peoples, such as Neanderthal man, had very few words. They had a few score words, or at the most a few hundred, as compared with the seven hundred thousand and more that are in a comprehensive English dictionary. This means that primitive man could not communicate nearly as well by words as we can. He made much use of a form of communication called gesture language.

It is surprising how much can be told by this gesture language, especially by people who use it a great deal as do the deaf and dumb, and as do all primitive people who have not many spoken words. Pointing to one's self means "I," pointing to the person addressed means "you"; pointing to the inside of the lips may mean "red"; pointing to the sky may mean "blue."

"Sleep" can be shown by closing the eyes and leaning the head on the hand. "Death" can be shown by the sign picture for "sleep" and then pointing to the ground. "House" can be shown by putting the tips of the fingers together like a roof. "Smoke" would be, perhaps, a spiral upward movement of the hand. A good illustration of an Indian picture-in-the-air is their gesture for water. They pretend to dip up water in a hand and to drink out of the hand. Perhaps it is from this gesture that our western settlers came to refer to water as "the drink," and to the Mississippi River or a large lake or the ocean as "the big drink."


SLEEP


SHELTER

We ourselves make much use of gesture language to-day. We cower or crouch as a sign of fear. We shiver to show that we are cold. We wrinkle up our faces to express pain or disgust. We laugh or smile to express joy. We shrug our shoulders. We stick out our tongues. We wink. We clap our hands or shake hands or kiss. We get a very large part of the story in our theaters, and particularly in our moving picture theaters, from gestures of the actors. As children we delighted in shadow shows where the shadows of hands against a screen may illustrate rabbits, goats, donkeys — whatnot.


WATER

But gestures alone do not make a thoroughly good means of communication. They cannot be seen after dark nor around a corner, and they are not very accurate. Most

of them can mean too many possible things. They are, furthermore, a slow way of talking. It is accordingly fortunate for our living together that men early (and it may be from the very beginning) made use of spoken words.

How did man get words? — Of course, even the animals have voices, and their cries mean something. The dog whines or barks or growls to express very different things. But these are "cries," not "words."

EXCLAMATORY CRY
POOH-POOH THEORY

If we assume that man at one time had no spoken words, how did he get them? We do not know. We can only make shrewd guesses. We start with one known fact. The vocal equipment in the throat and brain of man is more delicate and flexible than that of other animals. Our scholars argue that man, starting with such good speaking equipment, developed his spoken language in some or all of the following ways:

1. *The pooh-pooh theory of speech.* — One way is what we shall call *exclamatory cries.* Since even animals have exclamatory cries which tell others whether they should hide or run or turn to fight, of course earliest man could do as much. We find in our words to-day a good many sounds that seem to go back to exclamatory cries. "Tut," "oh," "ouch," "hi," "ho" are examples. Our word "pooh" is just the sound of blowing to show contempt, and such sounds are in other languages as well. The idea that at least a part of our words came from exclamatory cries is

sometimes called the *pooh-pooh* theory of languages. Of course it is a long distance from simple exclamatory cries to our more than seven hundred thousand words, but we are accustomed by this time to think of man developing very slowly over thousands of years.

2. *The bow-wow theory of speech.* — Then, too, it is argued that man picked up words in another way. He made *imitations of sounds* he heard, and these imitated sounds came to be words. It is not difficult to find plenty of this kind of words. Without stopping to indicate from what languages they come, notice these words: for rooster, "cockadoodledoo," "aaoa," and "okoko"; for donkey, "hee haw" and "eo"; for crow, "kaka" and "caw-caw"; for cat, "miau" and "mau." All of us know what is meant by the "hum" of a machine, the "boom" of a cannon, and the "gurgle" of a jug. This explanation of the origin of words is sometimes called the *bow-wow*, or *moo-moo*, theory.

MOO-MOO THEORY

3. *The yo-he-ho theory of speech.* — Still another theory may be called the *social*, or *yo-he-ho* theory. It assumes that when earliest men did things together, such as heaving at a log, they naturally made sounds that came in time to stand for the name of the act. Thus, "yo," "heave," and "haul" might be our modern form of some of the very earliest words.

Ways in which languages change. — As was said earlier we do not *know* how man got his first words. Once he had some words, however, we can understand how he got more of them, for we can see how he does it to-day. Our languages are ever changing.

New words. — For one thing, every language is continually adding new words. Sometimes these new words

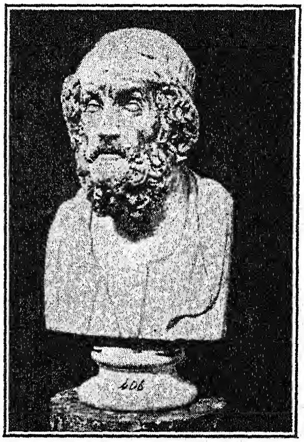
come in simply as changes in *intonation*. For example, in Siamese different ways of pronouncing "ha" mean "seek," "pestilence," and "fine." A great many Chinese words are of this sort. Sometimes new words come in through some *change in the word* itself. "Ride" and "road," "speak" and "speech," "spin" and "spinner" are illustrations. Sometimes we get new words by *imitation*. "Electrolier" is an imitation of "chandelier." Sometimes new words come in by *combining* old words. "Hardware," "steamship," "headman," "headache" are such words. Sometimes they come in by *borrowing* from other languages. Our word "engine" comes from the Latin "ingenium" which means that it was an ingenious thing. Sometimes they come in as just straight *inventions*. "Kodak" and "gas" are such words. A Dutch chemist of about 1600 A.D. made up the word "gas," which is to-day the father of such words as gaspipe, gaslight, gaseous, and gassy. Probably there is no family of children that has not invented words for its own little group. I know of one such group that talks of such imaginary animals as the "hairless spiroofer" and the "horned spiffledoof," whatever they may be.


HORNED SPIFFLEDOOF

New meanings for old words. — Then, too, as time goes on, old words frequently get new meanings. "Bank" once meant the bench used by the money changer in the market place, and a "bankrupt" had his bench broken. A "knave" was once just a boy and later a servant. To-day we have a head of an army, a head of a coin, and headings of a speech. We lose our heads, we collide head-on, we head the procession, we bring a boil to a head. Evidently "head" has taken on many meanings.

Words disappear. — We lose words, too. In the dictionary there are words marked "obs.," which means obsolete, or no longer used. There are others marked "vul.," which means they are "vulgar" in the sense that they are not used by our best writers or talkers. Many of these were formerly in good usage.

Speech knits us together. —It would be hard to overestimate the importance of speech in our living together. We said earlier that a group is any number of people, whether large or small, who think and act about the same things in much the same way; that is to say, they have common interests. Of course, groups think and act alike as a result of communication, and especially of speech.



HOMER

But talk does not merely knit us together in the present. It knits us up with all the past as well. As soon as any group has a considerable number of spoken words, there develops what we call tradition. We saw how important the Iroquois story-teller (page 41) was in passing on to the younger generation the traditions and the "right" ways of living of the tribe. Other peoples have had their story-tellers also. The bards of the Greeks passed down from generation to generation the stories that were later gathered together and are known now as the *Iliad* and the *Odyssey* of Homer. In medieval times there were story-tellers, the minstrels, who went from castle to castle telling stories and singing songs of the deeds and glories of their rulers and their peoples. We must not forget, too, the

story-tellers of every family — the father, mother, older brothers and sisters.

Language is a tool for thinking. — Talk, then, is a means of getting thoughts of the past and of the present. We should be a sadly ignorant people without our spoken words. But our words, both spoken and written, do more than merely carry thought. They greatly increase our ability to think. They are tools for thinking. Many a time you have seen a person who is at work at a problem, moving his lips and muttering to himself. He does this because the forming of his words helps him make his thoughts more clear. This indeed is the real reason for recitations in our school work. We understand a thing very much better by reducing it to words and telling others about it. We could never have thought out our sciences if we had not had words. That shows how important words are.

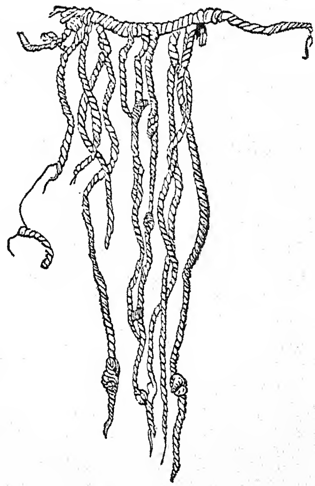
B. Multiplication of Powers through Writing

(How we got the alphabet and our present ways of writing; what they mean for us.)

The written word was needed. — The spoken word, important and useful as it is, does not meet all the needs of communication. It does not help us communicate with anyone who is beyond the reach of our voice. Even when the hearer is within reach of our voice he may not catch all we say, as we know from what used to happen in our childhood whispering games. Then, too, if some time goes by, the memory may not hold the message correctly. For such reasons, the traditions and stories that are passed down from father to son keep changing. If messages are to be kept exact and carried to persons beyond the reach of the voice, such a device as writing is necessary.

There are several very clear steps in the development of writing which finally led to the use of the alphabet. These steps are:

1. Mere memory helps.
2. Picture writing that carried the whole story.
3. Picture writing that stood for a word idea (ideograms).
4. Picture writing that stood for sounds (phonograms).
5. Phonograms that stood for syllables.
6. Phonograms that stood for the beginning sound of the syllable (a letter of an alphabet).

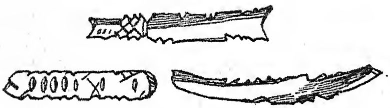


Courtesy of Clodd: The Story of the Alphabet, (D. Appleton and Co.)

PERUVIAN MEMORY HELP

The first step toward writing was memory helps. — The beginning of writing is found in memory helps, such as your mother made use of when she tied a string around your finger to help you remember something. Early man had many such devices. The ancient Peruvians had "quipus." These were systems of knotted cords. The cords were of several colors, and the knots were of many sizes and forms, so that the quipus helped the ancient Peruvians to remember their history, helped them to keep records, helped them to send orders to districts far away from their capital, helped them to keep track of details of their armies, and helped generally in all their memory work. Other peoples have used such devices as message sticks on which different kinds and numbers of notches meant different things. Others have used

painted pebbles. We are told of a city where the city fathers showed the boys the boundaries and whipped them soundly at all important landmarks so that the boys would remember the locations! We already know (see page 43) how the Iroquois used wampum strings and wampum belts.

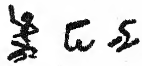


MESSAGE STICKS
One of these is an invitation to a party!

Then came pictures that told the whole story.—The difficulty with all such devices as notches on sticks and knots in cords is that these things do not resemble the events to be remembered, and so their help is not as great as it might be. Very, very early man learned to improve on such memory aids by using picture writing. This means that he made a fairly complete (even though crude) picture which set forth the story he wished to tell. We have such records on the walls of the caves of men who lived before neolithic times.

And here is the way a Dakota chieftain, Running Antelope by name, told of one of the events of his life. On this day he slew two Arikara Indians. The spear in his hand shows how he killed one Indian. The other Indian, as the picture shows, was both shot with a musket and struck down by a spear. The little symbol down at the bottom of the picture is supposed to be a running antelope. It is the old chief's trade-mark, so to speak. Had you ever thought of the modern trade-mark as picture writing?

Gradually pictures came to stand for words, for ideas, rather than for a whole story. — The pictures we have just examined are the simplest form of picture writing. They are complete pictures telling complete stories. As you would expect, through the centuries people learned to abbreviate pictures just as we abbreviate words to-day or even write them in shorthand. Take, for example, this illustration[1] of how the Egyptian picture writing for "man" was abbreviated. The first picture is easily recognized as that of a man. It is a hieroglyphic sign used about 5000 B.C. The second is an abridged form used by the priests in copying, at about 3000 B.C. The last sign came into popular use about 900 B.C. Anyone can see that the first picture is intended to be a man; but one is not likely to see that the later forms are men unless his attention is called to the fact.



As time dragged slowly on, the various peoples who used picture writing took still another step. They came to use the picture, not to mean the thing pictured, but to be a sign or symbol of something else. For example, the Pueblo Indians had on much of their pottery a picture of a tadpole,[2] but it did not mean tadpole. It meant summer. They came to use the tadpole's picture in this way because the pools of water were full of tadpoles in the summer time.

The short name for a picture thus used is *ideogram* (idea writing). This means simply that a picture is used to convey a certain *idea* to the person who looks at it.

The next step was to have pictures stand for sounds. — Through long centuries picture-writing peoples came to

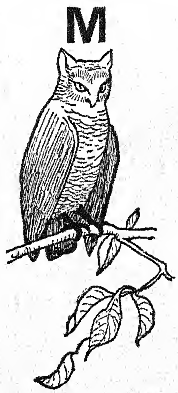
[1] Courtesy of Clodd, *The Story of the Alphabet.* (D. Appleton and Co.)

[2] Courtesy of Starr, *Some First Steps in Human Progress.* (Chautauqua Press.)

make the pictures stand not for the thing pictured, but for *sounds* of their spoken language. In other words, the pictures became what we call phonograms (sound writing). For example, pictures of an eye, a tin can, and a fly would

mean, "I can fly." The pictures represent sounds here and not the things pictured. They are phonograms instead of ideograms. We are familiar with these in rebuses.

Sound pictures next came to be used for syllables, instead of whole words, and presently only for the beginning sound of a syllable. — Once people had learned to use sound pictures (phonograms), they were well started towards an alphabet. The old sound picture, which once meant a whole word, came gradually to mean just a part of the word — a syllable — and finally just the beginning sound of the syllable. It was now a letter of an alphabet, for an alphabet is a set of symbols standing for the basic sounds in a language.

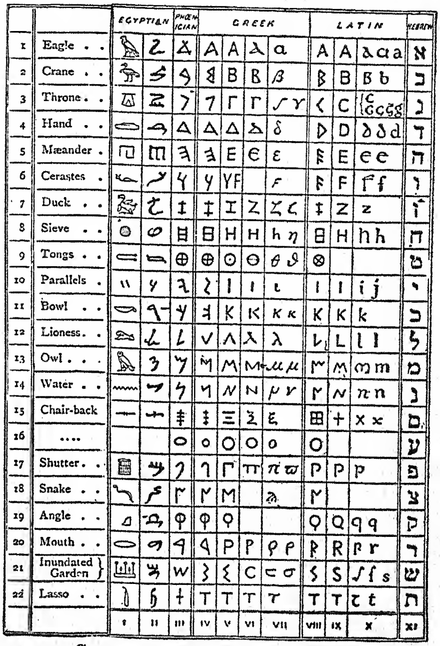


How this all came about may be illustrated from the writing of the Egyptians.[1] Very early they used the picture of an owl to mean their word for owl, which was "mulak." They gradually stopped drawing the full picture of the owl. Instead, they made a shorthand owl by using a little symbol that looked a good deal like the owl's ears with a beak between them. Gradually also this owl's-ear symbol became a phonogram for the sound "mulak." Later it came to stand for a syllable "mu," which is the first part of the full name "mulak." Still later it came to stand only for the first sound of the syllable "mu." To-day we call

[1] Taylor, *The Alphabet*, I, p. 9. (Kegan Paul, Trench and Co.)

that our letter M, which shows clearly its owls'-ears parentage.

There have been and still are many alphabets. Our own alphabet has apparently come down to us from the old Egyptians through the Phœnicians and the Greeks and the Romans. The ancient Egyptians started, as did so many other peoples, with picture writing. They carried this picture writing through all the steps we have studied, and finally they had an alphabet. After they got their alphabet, they did not stop using the earlier devices. They kept on using all of them, — the full picture, the shorthand picture, the phonogram, the syllable phonogram, and the single-sound phonogram. This, of course, was a very mixed system of writing made up of hundreds of symbols.



Courtesy of Clodd: The Story of the Alphabet, (D. Appleton and Co.)

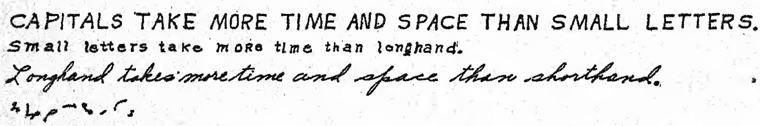
HISTORY OF SOME OF OUR LETTERS
What ones can easily be traced back to Egypt?

It happened that there was, bordering the Mediterranean, another group of people, the Phœnicians, who were great borrowers. They borrowed the Egyptian system of writing. Being shrewd borrowers they borrowed only the elementary sounds. In other words, they borrowed the alphabet and

left all of the cumbrous earlier symbols in Egypt. The Greeks and the Romans borrowed the alphabet from the Phœnicians, and from them it has finally come down to us.

What our present-day writing is like. — We may be glad that the Phœnicians borrowed only the alphabet. We have to learn only twenty-six letters. Out of them we make more than seven hundred thousand words. As far as that is concerned, we can, if need arises, make millions of words from these twenty-six simple sounds. There are languages that have never been reduced to such simple sounds. The Chinese written language, for example, has thirty or forty thousand characters, — these characters being just shorthand picture writing of whole words. A person who learns to write in that language or to read the writing of that language must learn a huge number of these signs. What a long time it takes to get tools to think with in such a language!

We must not think that the work of developing our means of written communication has all been done. It is still going on. One example may be seen in the development taking place in shorthand. The purpose of modern shorthand is



PRINT, LONGHAND, AND SHORTHAND

to enable one to write at about the rate another can talk. That is done by making symbols which are even simpler and more quickly made than are our letters. Shorthand is very widely taught to-day and is used extensively in secretarial work.

Although the alphabet is our main tool for writing to-day, we still make some use of earlier devices. We still use pic-

ture writing in rebuses, in maps, in such expressions as the "T-square" and "S-hook." Our Roman numerals I, II, and III are picture writing of fingers sticking up. In any almanac you can see such expressions as "☽ rises at 6 hr. 23 mi." ♀, showing the mirror-and-handle of Venus, stands for the star Venus. In some of the European time-tables, a little picture of a cup means a place where you can get light refreshments; and a little steamboat, a place where you transfer to the steamboat. Our written language has many, many devices that have come down to us from the earlier days of picture writing.

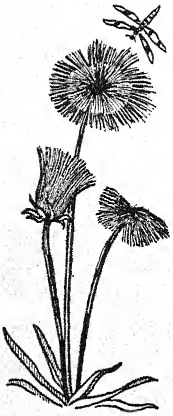
C. Multiplication of Powers through Printing

(Movable type, printing by power, paper making, the linotype, and the monotype give plentiful printing.)

Writing is a great multiplier of man's power of communication. It enables him to communicate with others much more exactly than can be done by speech, and to communicate with others who are distant from him. The written message can be sent far away; it can also be preserved for later generations. These are very great gains. Now let us see how the tiny trickles of man's early writing have grown to great floods of communication through the invention of printing. Let us see, first, the slow improvement in writing materials; second, how books and newspapers were made before printing; third, how printing came into the world; fourth, how printing was multiplied through the harnessing of power and machinery.

Man's slow improvement in writing materials. — It is often true that man makes only slow progress for a long time after he has developed one of the multipliers of his powers. It happened thus with writing. Once he became able to write, thousands of years went by during which he

merely made gradual improvements in his writing materials. Some of the earliest written records were made on stone. The Bible story of the Ten Commandments shows this stage of writing very clearly: "And the Lord said unto Moses, 'Hew thee two tablets of stone' . . . And he wrote upon the tablets . . . the ten commandments." Other records were written on tablets of clay, which were then dried in the sun or baked in an oven. Still other records were carved on the walls of temples and tombs, or on the sides of cliffs, or on wooden planks. Leaves of palm trees and the flat sides of bones were used. The inner bark of the lime tree, the maple, the elm, and the linden served on occasion. So also did linen and the metals after man had learned to make them. Of course, men early turned to skins for making writing material. Some samples of skin writing that are at least 4000 years old are still in existence.



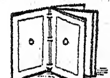
PAPYRUS PLANT

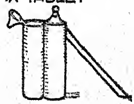
At least 5000 years ago the Egyptians learned to use the papyrus reed to make writing material. We get the word "paper" from "papyrus." The fibers of this reed lie in thin sheets. When the reed was cut into strips, these sheets could be separated and then placed side by side upon some smooth surface. On top of such a layer of these sheets, another layer would be laid at right angles. These layers would then be moistened or pasted together, dried in the sun, and one surface made smooth for writing. The result was a small sheet that could be used as we use paper to-day. This was the main writing material of Egypt, Greece, and Rome until several centuries after the birth of Christ. Anyone can see that it was slow work to make papyrus, and that it would be scarce and expensive.

As for pen and ink, early writers got along reasonably well. For writing on wax or stone, they used sharp-pointed instruments. For writing on bark or papyrus or skins, they used a brush or a hollow reed shaped much like our modern pen. Still later the quill was thus used. The ink was made in many ways, the most common way being by mixing soot and gum.

It is easy to see that there would not be many books made under such conditions. Writing materials were hard to make, scarce, and expensive. Then, too, the number of persons who could read and write was very small, being just a small group of priests and scholars. Nevertheless, as time went on and as men saw what a useful device writing was, enough of it was done in two or three little spots of the earth, such as Alexandria and Rome, to enable us to say that there was a business of bookmaking.


STYLI


WAX TABLET


INK

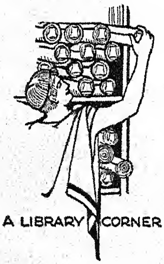
How books were made before printing. — In the busy market place of the Rome of two thousand years ago there was a corner used by the booksellers. Here were bookshops, the stone pillars of which announced the names of the newest books, displaying specimen pages or even entire rolls. Here the few scholars of the day met and talked. Let us stand among them. One of them has just come from the bookshop carrying a long, narrow roll of papyrus which he opens and reads.

We enter the bookshop itself, but there are no books of the kind we know. On the shelves are piles of rolls like the one our scholar friend was carrying. Some are made of papyrus; some are made of parchment. Hanging at the end of each roll is a card (*titulus*) that tells the *title* of the work and the name of its author. Some of the rolls are thicker than others, just as some books to-day are thicker than

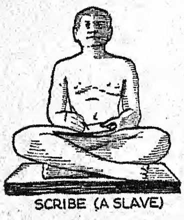
others. As we look at them we can understand that our word volume comes from the Latin *volvere,* which means *to roll.*

In one room of the shop, books are being made. Here are the bookseller's scribes bending over rolls of papyrus either copying or taking down the words of a man who is reading aloud from a manuscript. Bringing out an edition is a simple process in this shop of ancient Rome. The author brings his manuscript to the publisher. If the publisher thinks it is worth publishing, he puts his scribes to work. In a day or two the finished book is ready and is advertised on the stone pillars of the bookshop.

READING A ROLL



A LIBRARY CORNER



SCRIBE (A SLAVE)

We ought to be grateful that, later, people learned how to make the *book* (*codex* is the technical name) instead of the *roll.* Notice how much easier the book is to hold; how much easier it is to turn pages in search of a fact or a word than it is to unroll the roll; how readily we can use a bookmark, put in a footnote, keep books on shelves, have several books spread out for consultation at one time, as compared with the difficulty in doing such things with a roll. Take this book you are reading. How much more readily you can use it than the fifteen or twenty rolls it would have taken!

As your history teacher will tell you, after the Roman Empire lost its hold in Europe during the fifth and sixth centuries after Christ, there followed the long period of the Dark Ages in which barbarians destroyed much of the Roman culture. As for the writing and the making of

books, very little was done from the time of the fall of Rome down to the fifteenth century. That little was done by the monks in their monasteries, by a few professional scribes, and later by the scholars and stationers in the few universities.

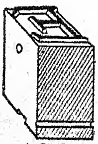
MONK IN SCRIPTORIUM

How printing came into the world.— Everyone knows what printing is. It consists of making words and illustrations appear by pressing inked letters or figures up against a smooth surface. The typewriter shows how it is done. In the typewriter, a raised letter strikes an inked ribbon up against a sheet of paper, and thus prints letters on the page. The little device with the raised letter (made in reverse) at the end is called a "type."

Printing is a very simple thing. It is so simple that quite primitive savages know how to carve patterns on hard materials and "print" in soft clay. For thousands of years kings and other important persons have used signet rings to "sign" documents. A pattern was made on the ring, and this was pressed into a lump of wax stuck on the document. The Chinese knew how to carve words (in reverse) on wooden blocks and how to print from them, perhaps 2000 years ago. If there had been good communication between Europe and China in those days, Europe would have had printing much earlier than she did have it. But even so, Europeans gradually became able to print from wooden blocks. At first they printed merely the illustrations for their books from such blocks and wrote out the text. Later, they carved out whole pages in reverse and printed from them.

SIGNET RING

The movable type greatly increased ability to print. — If printing is such a simple thing and if people have long known how to print, what is meant by saying that about 1460 A.D. Gutenberg or Faust or Coster (there is a great quarrel as to who deserves the credit) invented printing and thus multiplied man's powers of communication? Just this. Gutenberg (he is usually given the credit) learned an easy and cheap way to make a metal type for each letter, instead of carving out a whole page on a wooden block. A block page could be used only for printing that page. Gutenberg's metal types, however, could be "set" for one page and then reset for other pages and so on. This is called *printing from movable type*. It greatly lowered the cost of printing.



A TYPE

The gain that comes from movable type may be seen from the word "print" itself. If we engrave the word "print" on a wooden block in reverse (TИIЯꟼ) the block will reproduce only that one word. If, however, we make types for each letter, we can combine them in various ways and can make not only the word "print," but also pin, pit, pint, pip, rip, nip, nit, it, in, tin, tip, and trip. If, in addition, we find a cheap and easy way of making large quantities of these movable types instead of doing all the slow, hard work of engraving the block, we have certainly greatly increased our ability to print. As a matter of fact we have found cheap ways to make type. We can to-day make 50,000 letters an hour.

Printing multiplied by harnessing power and machinery. — It is the same old story. After Gutenberg invented his multiplier in about 1450, there were for centuries merely slow additions to man's printing ability. There were no such floods of printed matter as we have to-day. Many things had to happen first.

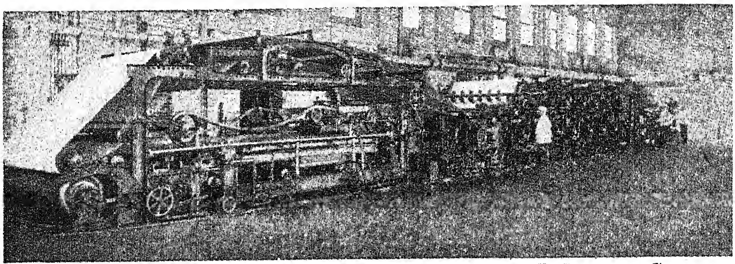
Plentiful paper. — For one thing, we could not have much printing until we had cheap and plentiful paper instead of the scarce and expensive papyrus and parchment. We learned to make paper from the Chinese. About 750 A.D. some Arabs captured a few Chinese and from them learned to make paper by beating flax and other fibrous plants into a pulp and then drying this pulp in thin sheets. This knowledge spread from the Arabs to Europe. Long before Europeans learned to print, paper had become their main writing material.

Courtesy of Wheelwright: From Paper Mill to Press Room, (George Banta Publishing Co.).

MEDIEVAL PAPER MAKING

The pulp was beaten with the aid of a water wheel. A thin layer of pulp was spread over a sieve. Water drained out and the resulting sheet of paper was hung up to dry.

But as the picture shows, paper making was a slow process by which a few sheets (no rolls) a day could be made. Man had to wait until metal was more plentiful and until he had harnessed power before he could have giant paper-making machines turning out tons of paper in the time formerly taken to make pounds. It was not until 1770 that the Holland beating machine for beating the pulp was invented; not until 1804 that Fourdrinier made the machine that bears his name; not until 1827 that the Fourdrinier machine could make an endless roll of paper; not until 1840 that it was really proved that wood pulp could be used to give a plentiful supply of raw material. In other words, only the last few generations have seen a plentiful supply of printing material. And, of course, plentiful printing had to wait for plentiful material.

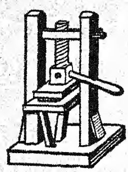


Courtesy of Sadtler: Chemistry of Familiar Things, (J. B. Lippincott Company).

FOURDRINIER MACHINE

Pulp enters this machine at one end and emerges at the other as a roll of paper. This giant is only a small part of a modern paper mill.

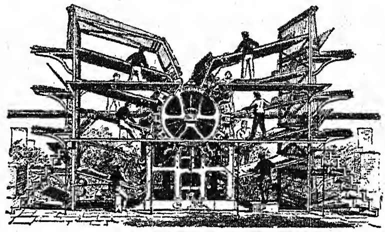
Power presses. — For another thing, we could not have plentiful printing until the simple printing press of Gutenberg had been replaced by modern printing machinery. This picture of Gutenberg's press shows a ramshackle, wooden hand press on which one could print a few sheets an hour. The later wooden presses were well built, but there was no other marked improvement in the printing press until 1798 (over 300 years!) when Stanhope made a press of iron. In 1812-13 Koenig made a press that used a revolving cylinder. A revolving cylinder could be attached to an engine. The result was that in 1814 the first *power* newspaper press was used by the *London Times* to print newspapers at what was thought the marvellous speed of 800 per hour.



GUTENBERG'S PRESS

In 1845 Hoe learned how to fasten the type on the revolving cylinder and to feed the paper up against the type by means of other cylinders, thus becoming able (after some improvements) to turn out 20,000 copies per hour. In 1865 Bullock printed from a continuous roll of paper instead of from sheets, and this brought the output up to 48,000 copies an hour. Since that day various improvements have given

us the modern printing press which can print, cut, fold, and count 300,000 newspapers per hour. But only the last few generations have seen printing machinery that could work rapidly. And, of course, plentiful printing had to wait for the rapid printing press.

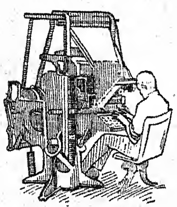


Courtesy of R. Hoe and Company: A Short History of the Printing Press.

PRINTING IN 1850

The paper had to be fed to the press in sheets. To-day continuous rolls are used and the feeders (men) are no longer needed.

Linotype and monotype. — Still another thing must be said. We could not have plentiful printing until we had found some way to set type rapidly. It is a slow, expensive job to set type "by hand." It was not, however, until 1884 that a machine, the linotype, was invented to do that work. The linotype has a keyboard something like that of a typewriter. When a key is pressed a matrix, or mold, for that letter falls into place. Key after key is pressed until a whole line of matrices is in place, and then hot metal squirts into the matrices and behold! a line-o'-type! The matrices are then automatically picked up by the machine and put back in place to be used again. The process can go on day after day. The main trouble with the linotype (it is not a serious trouble) is that if one mistake is made in a line, the whole line must be reset. Even this trouble ceased to be a trouble in 1888 when the monotype was invented. In the monotype, one type at a time is cast, — not a whole line. Accordingly, only the incorrect letter needs to be replaced when an error occurs.



LINOTYPE

Illustrations. — Plentiful paper, power-driven printing presses, and power-driven typesetting machines have made

type printing plentiful and inexpensive. The invention in 1796 of lithography, by which pictures could be transferred to plates and printed, was the first step in making it easy and inexpensive to print pictures. In the last two generations such strides have been taken in this field that pictures are now a commonplace in our printing.

The newness of abundant communication through printing. — No matter in what direction we turn, we are amazed at the newness of our present ways of living together. Our easy command of fire, our abundance of metals, our harnessing of power and power-driven machines, our scientific knowledge, our plentiful printing are all new. To see clearly how new our plentiful printing is make another chart like the one on page 84 and insert the dates and events of this chapter. Use the heading:

Six Hundred Years of Printing

With that chart made and in a notebook, the dates may be forgotten if only we keep our general impression of the newness of inexpensive printing. "Our world is only in the beginning of effective ways of passing knowledge on."

One thing our schools do. — By this time it should be clear why certain things are done in the schoolroom. The drill in the sounds of our words is full of purpose. It is giving us the tools out of which we can make words, and this will help us think. The drill in writing gives us the same sort of tool. The drills in dramatics, in art, and in music are partly intended to add to our enjoyment of life, but also they are partly intended to make us better communicators.

Our schools do well in making us good communicators. Good habits of communication are absolutely necessary to happy living together in our group. They let us reach back and think the thoughts of all men who have gone before;

they put us in a position to pass these thoughts and our new thoughts on to later generations.

PROBLEMS

1. Define or explain:

Tradition	The pooh-pooh theory of language
Rebus	The bow-wow theory of language
Charades	The yo-he-ho theory of language

2. Look at the paragraph on "the enormous extent of modern communication" on page 211. Thus far to-day, through what means mentioned there have you received communications?

3. Plan out how to tell in gesture language the way African savages made iron. See page 90, Chapter III.

4. Do we use gestures to-day mainly as a whole language in itself or mainly as a means of aiding the spoken language?

5. What is the difference between cries and words? Is a parrot a word user in the same sense that we are? Why do words give man a broader mental life than mere cries could give him?

6. What good can come from talk? Can harm come from it?

7. "Our science could never have developed without spoken and written language." Show why this is true.

8. Many of our words come from Latin. Explain why some persons think it important to study Latin.

9. Be sure you understand the meaning of each of these steps in the development of the alphabet:

a. Picture writing that told the whole story.
b. Picture writing that stood for a word idea (ideograms).
c. Picture writing that stood for sounds (phonograms).
d. Phonograms that stood for syllables.
e. Phonograms that stood for the beginning sound of the syllable.

10. "Writing meant a great increase in the ability of people to coöperate with one another." Show why.

11. A quick, keen tool is better than a clumsy one. Show that our alphabet is a better tool than the word-characters of the Chinese. Show that young persons can get to work more quickly with our tool than with the Chinese tool.

12. Make a list of cases in which it is worth while to be able to write as fast as a person can talk.

13. Could one tell of geographical locations by spoken word alone, unaided by printed maps?

14. This book could not have been made unless:
   a. Man had learned to write;
   b. Chemistry had helped make the material;
   c. Metallurgy had been developed;
   d. Mathematicians had studied levers;
   e. Engineers had made machinery.

Give an illustration of the effect of each of these five matters in making this book. Can you add to the five?

15. "The printed page is the door by which one enters the larger rooms of life." Explain.

16. In what ways was Gutenberg's movable type an improvement over block printing?

17. Why are books cheaper to-day than they were in 1500? Would you give the same reasons when comparing to-day with 1800?

18. The Chinese knew how to make paper perhaps 2000 years ago. Europeans have known how to make it perhaps 1000 years. How, then, do you explain the fact that there was no such machine as that of Fourdrinier until a little over 100 years ago?

19. Why is it important to have plentiful and inexpensive printing?

20. Printing has been revolutionized in the last three generations. How?

21. "That's a dirty piece of newspaper blowing up the alley," said a boy. "So it is," said his father, "and it is one of the most wonderful things in the world, at that." Why did he say so?

22. Find out what the mimeograph and the multigraph are. How are they used in communication?

23. Make the chart mentioned on page 234.

24. Answer the questions at the beginning of the chapter, page 211.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter VII.

1. Gesture Language (two complete stories told entirely by gestures).
2. Feral Man (what happens to persons who do not communicate with others).
3. Words and Speech as Aids to Thought (what words and speech meant in the growth of Helen Keller's mind).

See also Chapter X.

Problems to think over are given in these reading selections.

CHAPTER VIII

MULTIPLICATION OF POWERS BY CONQUERING DISTANCE

A. Frontier Roads and the Conquest of the Waterways
B. The Conquest of the Land by the Railroad
C. The Automobile and the Conquest of the Air
D. Electricity Annihilates Distance in Message Sending

Questions to Keep in Mind while Reading This Chapter

1. What powers has man developed as a transporter?
2. What powers has he developed as a message sender?
3. What do we mean by saying that man is shrinking the earth?

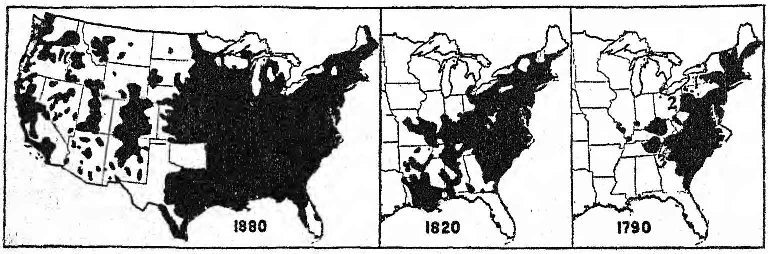
Man, the communicator, found that talking, and later writing, and much later printing were not enough. He needed effective ways of carrying himself, his goods, and his messages from place to place. This part of the story of his progress may be called his conquest of distance.

Our own country is the best example of man's conquest of distance. — It so happens that, of all the countries of the world, our own is the best to use for a study of man's conquest of distance. We have not only settled a vast territory; we have knitted it into a really United States.

In the early sixteen hundreds (the first settlement of Virginia was in 1607; and that of Massachusetts in 1620), a few scattered settlements were made on our Atlantic coast. The land was a wilderness, with no roads and even with very few Indian trails. The dark, grim covering of forest was

unbroken for a thousand miles inland, save where some winding river or craggy mountain pierced it.

Small wonder, then, that the first hundred years enabled the colonists to paddle and hack their way inland only about one hundred miles (a mile a year!) and that the second hundred years added only about two hundred more miles (two miles a year!) to the conquest. The population map of 1790 shows that, in the main, we had penetrated to our great eastern mountain barrier and that we were beginning to go



THE CONQUEST OF A CONTINENT

The areas in black are those in which there were two or more inhabitants per square mile in the years mentioned.

through the three great breaks in that barrier: the Hudson-Mohawk way (marked 1 on the map); the Pennsylvania way (marked 2 on the map); and the Cumberland Gap way (marked 3 on the map). Remember that almost two hundred years had gone by in this conquest of three hundred miles. Then, as the population maps of 1820 and 1880 show, in three quarters of a century we conquered 3000 miles, — through to the Pacific coast! And this vast stretch of territory has been firmly knitted together into one nation! This is one of the great achievements of human history. It is a remarkable conquest of distance. In this chapter we are to study some of the more important devices used in this conquest of distance.

A. Frontier Roads and the Conquest of the Waterways

(The use of roads, rivers, canals, and the steamboat in the conquest of a continent.)

Frontier-land travel was very difficult. — When one talks of frontier-land travel in our country he covers a period of at least two hundred and fifty years, from the first settlement in 1607 to the time (say 1880) when we ceased to have a frontier. During all these years there was always some part of the country in which land travel was only a little better than it was in the time of neolithic man. Always one word fitly described it, and that word was "terrible."

A LOG BRIDGE

Wretched colonial roads. — In the early colonial days, wheeled vehicles were unknown. They had been rare in the mother country England. They were useless in the new country, where the only roads were the narrow Indian trails. Of course, as settlements increased, it became wise to widen these trails, and from 1650 on we hear of colony after colony making provision for road making. On these roads, wheeled vehicles began to appear. But we must not think of these colonial roads as being like ours of to-day. "Road making" often meant merely clearing out fallen timber, blazing or notching trees so that one would not lose the road, throwing logs into marshy places, and cutting stumps so that they did not stick up too far. There were few or no bridges, and the fords were dangerous.

The early American road was a frightful thing. Watery pits were encountered wherein horses were drowned and loads sank from sight. The first postrider's trip between

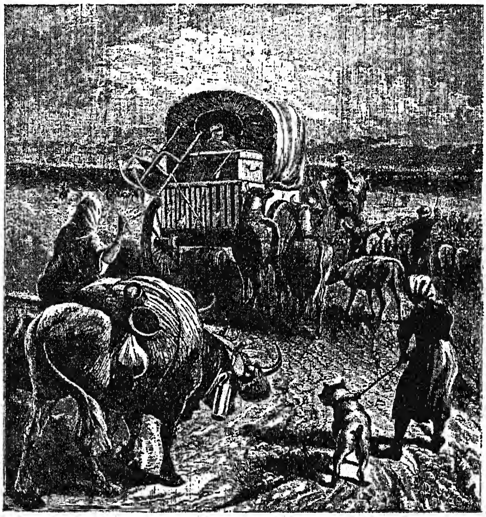
New York and Boston (made in 1673) took three weeks. We cover that distance to-day in less than two hours by airplane. As late as 1766 it took two days for a passenger coach to go from New York to Philadelphia. It now takes two hours by train. It was not until 1782 that coach service was installed between Boston and New York, and the trip took six days. In 1796 it was said of the road from Philadelphia to Baltimore, "chasms to the depth of six, eight, or ten feet occur at numerous intervals. Coaches are overturned, passengers killed, and horses destroyed by the overwork put upon them." Before 1800, the turnpike, a road surfaced with fine stone, was rare on the Atlantic seaboard and, of course, quite unknown elsewhere. No wonder people did as much of their travel as they could in winter, when the frozen ground and snow let them use sleds.

Roads to the West. — If these were the roads of the eastern settlements, what were those leading to the West like? As one example, let us look at the "Wilderness Road" which Daniel Boone made to the west through Cumberland Gap in 1775. The only tools for road building that Boone and his men carried were axes. Boone went first, picking out the way and cutting notches, or "blazes," on the trees. His men chopped down the small trees and underbrush. They went around the larger trees. The path was made wide enough for horses but not for wagons. This was the famous Wilderness Road!

As another example, take the Cumberland Road, or National Pike. This road was started (with the aid of the United States Government) from Cumberland, Maryland, in 1806-8 and now runs out into Illinois. The aim was to have a great highway connecting the East and the West. At first, even this road was very crude. Only those trees that were less than one foot in diameter were cut level with

the surface of the ground. The larger trees might have stumps fifteen inches high. If, however, they were in the center of the road they must be "round and trimmed so as to present no serious obstacles to carriages"! Imagine going over such a road in the springless wagons of that time!

Soon, however, the road was improved, and it became a great channel of communication with the West. The traffic grew as the country grew, and, in time, companies were organized to handle it. The freight traffic was handled mainly in the huge Conestoga wagons with six or eight horses attached. The passenger traffic was handled by stagecoach lines.



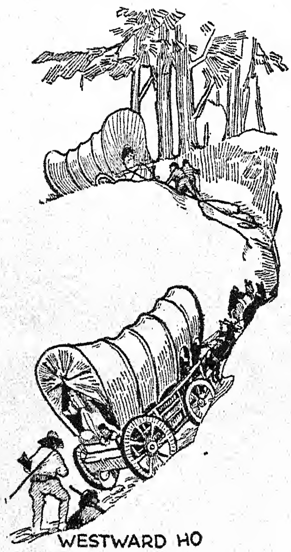
MOVING TO NEW HOMES IN THE WEST

While this old print is not a picture of the Cumberland Road, it shows one kind of traffic that went over that road.

The National Pike was by far the best road to the West. As for the roads in the Middle West itself, there were very few good ones. At their best in dry weather, they were passable. At their worst in wet weather, they may be illustrated by the main street in early Chicago where a coach remained mired for a week with a sign painted over it "no bottom here"!

Early transcontinental roads. — Once the settlers had penetrated to the treeless plains of the farther west, they

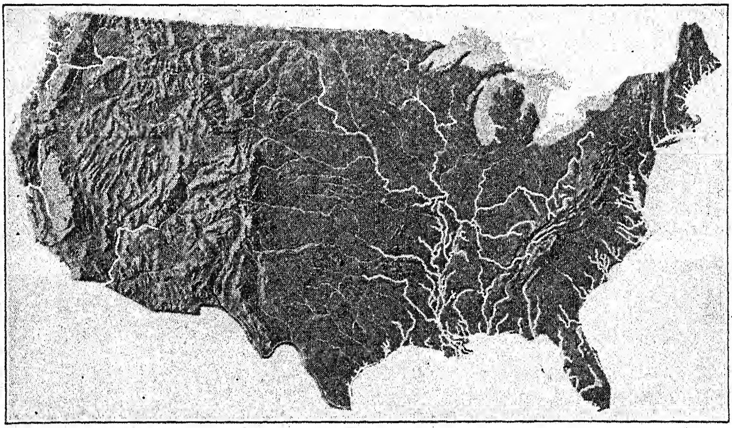
could travel over the level prairies in the famous "prairie schooner." But when it came to conquering the desert west and the mountain passes of the farthest west, it was a different story — one that repeats the hardships of the earlier conquest of the Appalachians, and therefore need not be told again. The emigrations to Oregon, beginning in the 1840's; the trek of the Mormons to Utah in the 1840's; the rush to California after the discovery of gold in 1848 — these are the great chapters of that story. They are chapters athrill with suffering and heroism and conquest.


WESTWARD HO

The use of rivers in the settlement of the country. — The account of our frontier roads shows how slow and difficult the task of conquering our distances would have been if roads had been our only means of transportation. Fortunately there were other means.

To begin with our colonial days again, the map on the opposite page shows that the settlers were able to use waterways. Along the coast, where the colonists first settled, the ocean served. As they pushed inland, the many navigable rivers (see the map) gave them access to the country. After they broke through the barrier of the mountains and began to settle the interior, they were again helped by the navigable rivers. The most-used route was overland to Pittsburgh and then down the Ohio and Mississippi and up their tributaries. The map shows that these streams touched a great stretch of territory, and thus helped greatly in the settlement of the West.

The flatboat — When a pioneer moved west with his family and his few household goods, he usually made or bought a flatboat at Pittsburgh for the later stages of his journey. The flatboat was, as one would guess from its name, a flat, rectangular vessel that drifted down the stream with the current or that was propelled by long oars. Several families would embark in one of these boats with their farm equipment and drift for hundreds of miles to their unknown new homes.

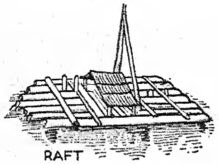


THE NAVIGABLE RIVERS ARE SHOWN IN WHITE

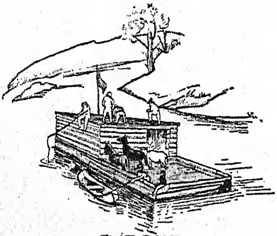
One author tells of the life on the flatboat, how, "some backwoods genius on the cabin roof would touch the resin to his fiddle-bow and send the wild strains . . . to the wooded shores and back again; while the family mule gave vent to his emotions in a loud heehaw, the pigs squealed, the children shouted and danced in the melody of the combined orchestra, and the women rolled up the bedding, milked the cow, hung out the wash, and killed a few chickens for dinner."[1]

[1] From Seymour Dunbar, *History of Travel in America*. Used by permission of The Bobbs-Merrill Co.

There were other aspects of the flatboat voyage that were not so kindly. In the forests along the shore, broken only by occasional trading posts or settlements, were the Indians. They were not willing to give their waters and their forests to the white man and often attacked the river boats. Then, too, the rivers of those days were full of logs and old snags that added to the dangers of the trip.



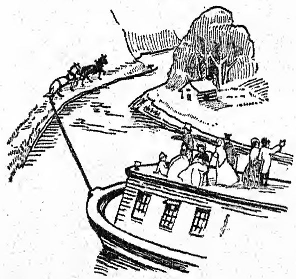
RAFT



FLAT BOAT

Canals were also important helps in the settlement of the West. — As we look at the map on page 243 we see that there are great stretches of the country in which there are no navigable rivers. These regions had to be opened up by roads, by railroads after they were invented, and by canals. Just now we are interested in water transportation, so we shall deal only with the canals.

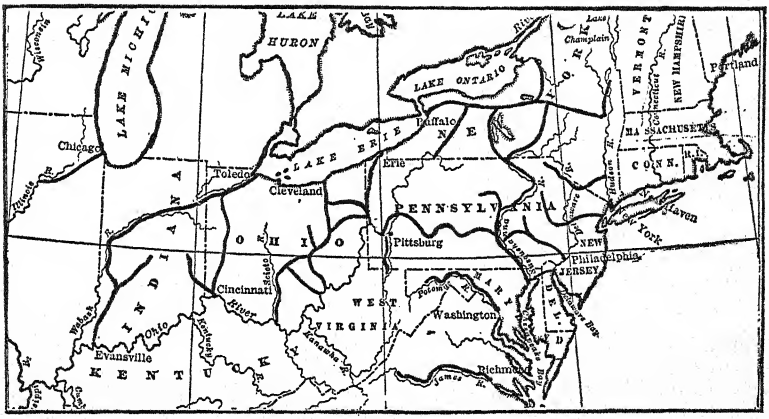
The Erie Canal. — One region, in particular, invited canal building. This was the Hudson-Mohawk Valley in New York, leading out from the Atlantic into the Middle West. It was a reasonably level, well-watered territory, and everyone could see that a canal through the region would connect the vast water routes of the Great Lakes basin with the Atlantic Ocean. This would make a great "water highway" to the growing West.



CANAL BOAT

After several false starts, the State of New York began building the Erie Canal through this territory in 1817. It

was a hard task. Mechanical excavators had not yet been invented. The work had to be done with teams and scrapers, with shovels and wheelbarrows. When it was finished in 1825, it was over 350 miles long, 40 feet wide at the top, 28 feet wide at the bottom, and 4 feet deep. Compared with our engineering works of to-day it was just a good big ditch. Ditch that it was, it meant a great deal to our people. The



The Main Canals Built

Notice how they connected the waterways of the middle west with the Atlantic Ocean.

whole nation, and especially the State of New York, celebrated for days the union of the Atlantic and the Lakes.

Other canals. — There is, in this canal building, a story your history teacher will tell more fully than it can be told now. The early settlers in our Middle West did not live very full lives. The land was even richer than it is now, but there was not much use in raising more products than the family itself would consume. The only ways to market before the Erie Canal was opened in 1825, were by the long voyage down the Ohio and Mississippi and then over the seas; or by the still longer and harder voyage up current

and then over the rough mountain roads. The Erie Canal was so much easier and cheaper a way to market that a sort of craze for canal building swept over the Middle West from 1825 to 1840. It was in this period that most of the canals shown on the accompanying map (page 245) were built. Some of these canals were poorly located, and most of them were gradually driven out of business by the coming in of the railroads after 1828. But they served their purpose. They were steps in human progress.

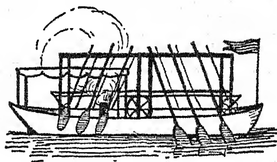
The steamboat meant a multiplication of man's transportation. — While the beginnings of our water transportation can be told without reference to the steamboat, its great development was due to man's servant, steam.

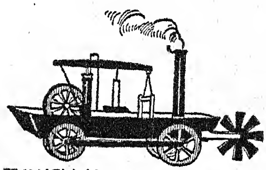
It is hard to know just where the story of the steamboat begins, since the invention of the steamboat depends (as is always the case) upon so many other inventions, and especially upon boats and the homely water wheel. These matters go far, far, back in man's history. It is said, for example, that back in the days of ancient Rome, one of the Roman emperors crossed to Sicily in a boat moved by paddle wheels, turned by oxen.

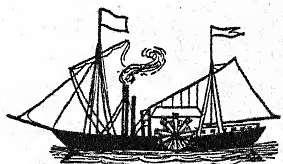
Fulton and the Clermont began a new era. — But it was the use of steam to drive paddle wheels, and later the screw, that gave us real mastery of the waters. As was true of the steam engine, there were many unsuccessful and many near-successful attempts to make a steamboat before the American, Robert Fulton, solved the problem. The pictures give a few examples of these early attempts. There was much to learn; much to do. How different should the shape of the vessel be from that of a sailing vessel? Where should the engine be placed? What was the right size of the paddle wheels? Where should they be placed? How much fuel would the boat need to carry? Where should it be put?

These are only examples of the mechanical and scientific problems that had to be considered.

In 1807, when Fulton's steamboat, the *Clermont*, was ready to be launched, there was interest in the experiment on both sides of the Atlantic. Most people, of course, ridiculed the idea, and it was hard for Fulton to keep up his faith until the day of the first trip dawned. We may imagine his anxiety on that day, especially when his boat balked for about half an hour. *The boat ran.* It made the trip from New York to Albany in thirty-two hours, a wonderful achievement in those days. And those days were only a little over 100 years ago.


FITCH'S BOAT OF 1787


EVANS' LAND and WATER BOAT 1804


FULTON'S FIRST SUCCESSFUL STEAMBOAT

It helps us see what a new thing the steamboat was when we read how people acted when they first saw it. "Some persons took to the woods in fright. Some prayed for protection from the monster which was marching on the waters."

Later work of the steamboat.— Once the problem of the steamboat had been solved, the need of good transportation in the Middle West soon caused steamboats to appear on the Ohio, the Mississippi, and the Great Lakes. True, the steamboats could not be used on the canals. The "wash" of the waves would ruin the banks. Steamboats could, however, gather up from the shores of the Great Lakes traffic for the Erie Canal; and they could carry crops down the Mississippi and over the seas to our Atlantic cities and to Europe. Inland

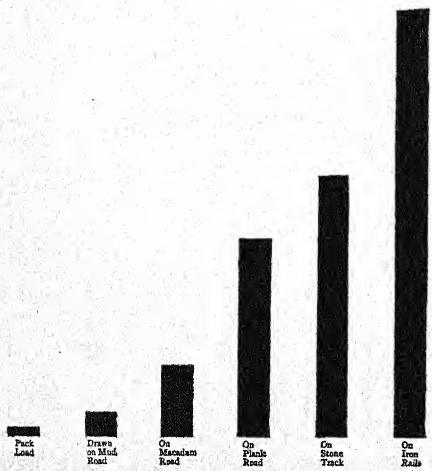
trade developed in every way. By 1850 the traffic on our inland waterways was equal to that between all the countries of the continent of Europe. Man, the communicator, was knitting together a united nation, one whose every section depended upon every other section; one where each of us could coöperate in the better living of all of us.

To-day, there are not many steamboats on our rivers and canals, but steamships carry nearly all of our lake and ocean traffic. Steam rather than the sail has now become our great servant on the waters.

B. The Conquest of the Land by the Railroad

(What the railroad is and what it means for living well.)

Let us again look at our map on page 243. Important as navigable rivers and canals were, they would not suffice for the conquering of our West. They could not penetrate the rough regions. They froze up in winter in much of the territory. Something else was needed. This something else was the railroad.

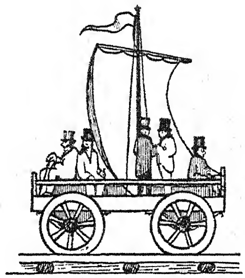


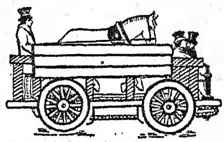
The Load One Horse Can Manage

This chart shows why the "iron horse" on a railroad means so much for living well.

A road of rails is a very old device. — No one can say when man first made a road of rails. We know that in ancient Greece roads were hewn out of stone with ruts cut deep to fit carriage wheels. We do not know just when the idea came of raising the tracks above the level of

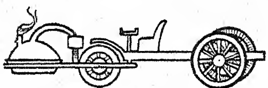
the road, but it, also, is a very old idea. On smooth rails, wheels moved with much less friction. Men and animals could draw many times the load they could draw on the muddy roads.

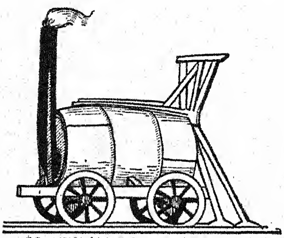

SAIL CAR


TREADMILL CAR

As one might expect of question-asking and problem-solving man, somebody was always trying to get better power to apply on these railroads. Sails were tried, but they were not very practicable. The wind did not always blow in the right direction. Treadmills were put in the cars, and the tramping of a horse or mule turned a machine that drove the car. But nothing was found that was as effective as the horse-drawn car until after much experimentation with steam and later with electricity.

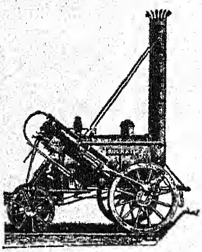
Early experiments with the locomotive led up to Stephenson's Rocket. — Since roads made of rails were not very numerous, it was natural that some of the early attempts to use the steam engine for land travel would be worked out on ordinary roads, thus foreshadowing the automobile of a hundred years later. A Frenchman, Cugnot, had an engine that ran on the streets of Paris at the speed of about three miles an hour (1769), until it upset one day with a crash. Brunton (1813) made his queer "mechanical traveler" which kicked itself along with poles, looking like some strange


CUGNOT'S ENGINE 1769


BRUNTON'S MECHANICAL TRAVELER

grasshopper. One day it exploded. Trevithick (1803) made an engine that actually pulled a load. The story is told of his engine nearing a toll gate, which was opened in great haste by the tollkeeper, who thought that the devil was driving by in his carriage. He assured "dear Mr. Devil" that there would be no toll to pay if he would only drive on as fast as he could!

These are only three examples of dozens of early experimental locomotives. They all lacked elements of success. Some were faultily made; others used too much fuel; others could not get up steam fast enough. For one reason or another, they did not work well enough to be really successful. Finally, there came a time when an Englishman, George Stephenson, using all that had been done by others and making improvements of his own, made the first successful locomotive. As early as 1814 he made one that worked well; but it was not until 1829 that a public demonstration of his "Rocket" made it clear that a new era of transportation had dawned.

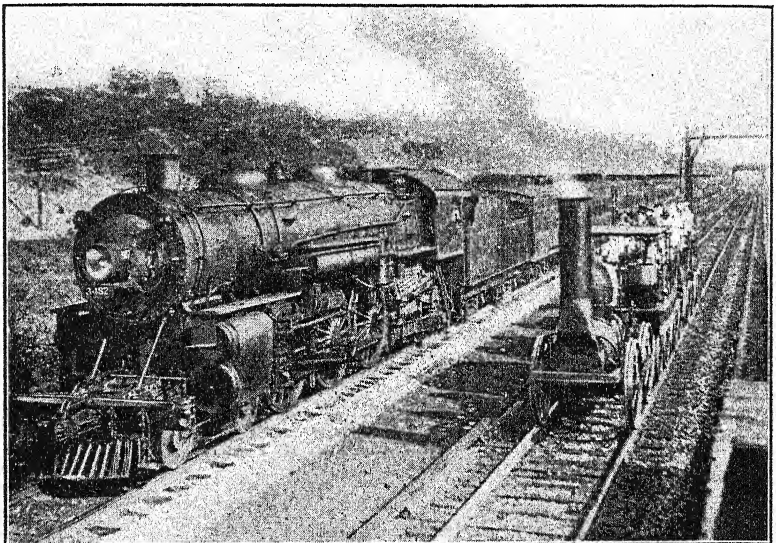


THE ROCKET

What our early railroads were like. — It is hard for us to-day to realize what our early railroads were like. On the opposite page is a picture of a railroad train of 1831, placed alongside one of our present-day locomotives. A description of the first trip of this train would tell of passengers being jerked off their seats and thrown into heaps when the train started and stopped. It would tell of the clothing of the passengers being set on fire from a deluge of sparks from the wood being burned in the engine.

Other accounts of these early roads supply further details. Trains almost never ran at night. It was too risky. When they did run at night, they made a headlight by putting in

front of the engine a flat car carrying a pile of sand, on top of which a fire of pine knots had been kindled. As for signals, there were none. When a train pulled into a station, the engineer would climb a pole and look up the road to the next station, if he could. If a train was long overdue, the only way to find out what had happened was to set out with

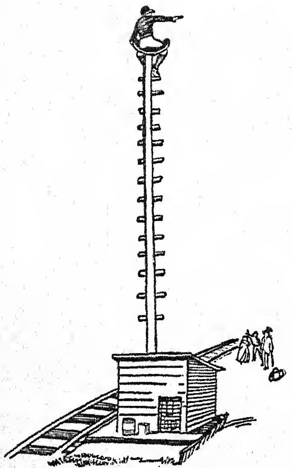


Courtesy of New York Central Railroad Co.

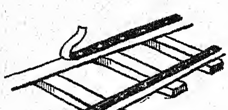
A Modern Locomotive Compared with an Early Train

another locomotive and go cautiously until the lost train was found. Often it was found off the track or stopped by a "snake head." These snake heads were terrible things. The railroads of those days had rails of wood with a strip of iron nailed on top. The nails would sometimes come loose, and, as the car passed over the iron strip, the strip would curl up around the wheel and thrust itself up through the floor of the car "like a snake head," — never, as far as is known, to the joy of the passengers.

We rapidly developed the greatest railway system of the world. — Many of these early troubles were soon corrected. The others were endured, for the transportation-hungry nation realized that the railroad was what it had long wished for, — a cheap and rapid means of communication that could go into rough territory. Every community clamored for a railroad, and the railway net spread rapidly. By 1850 the railroad began to drive all canals, except those most favorably located, out of business. By 1853 four lines ran from the Atlantic Coast to the Middle West. By 1869 the Atlantic and the Pacific had been joined by iron bands.



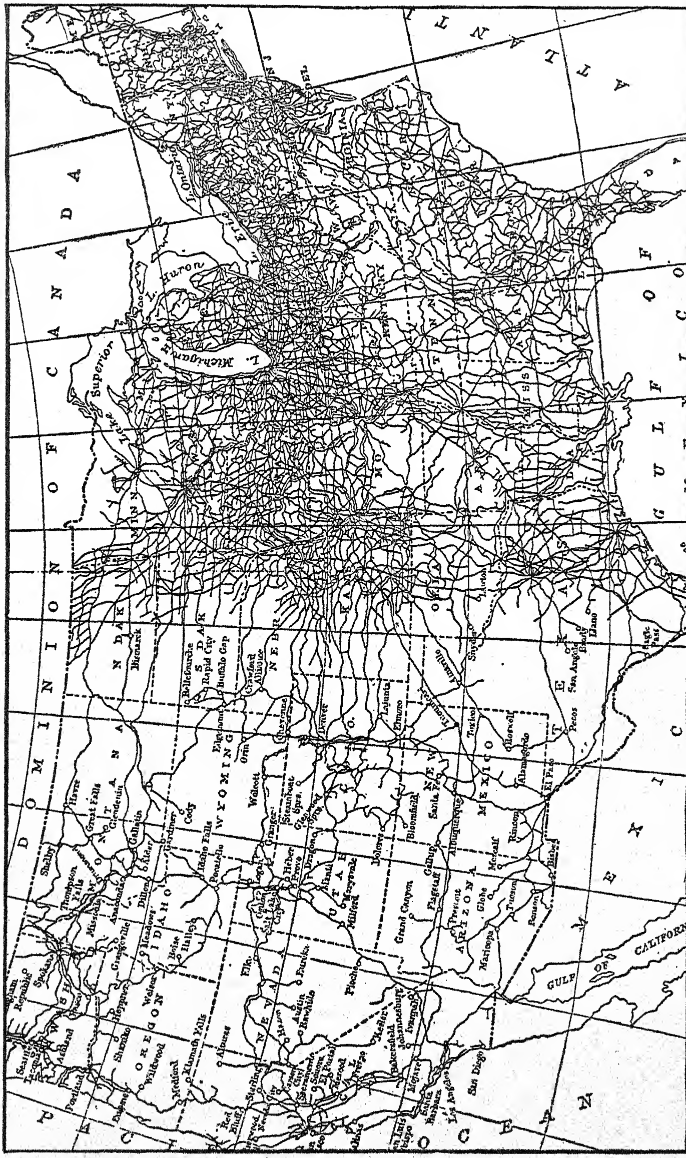
SIGNAL POLE



EARLY TRACK WITH SNAKE HEAD

Then came the time of plentiful and cheap steel (see page 95). The result was stronger tracks, bridges, and cars; more powerful locomotives; faster schedules; and heavier loads. The development of the electric motor (see page 120) presently made possible the use of electricity on our city tracks, in our great terminals, and even out through the country.

To-day, the railroad net simply blackens certain parts of the map and reaches out through all other parts. What can be accomplished on this net staggers the imagination. A single modern Pullman train does the work of 500,000 porters. A freight train does the work of 1,000,000. No other people move about so much or so rapidly as we do.



Courtesy of Johnson and Van Metre: Principles of Railroad Transportation, (©D. Appleton & Co.).

THE RAILWAY NET OF TO-DAY

No other people trundle about such masses of freight. No other people have ever been so knitted together by transportation devices. We are *one* country.

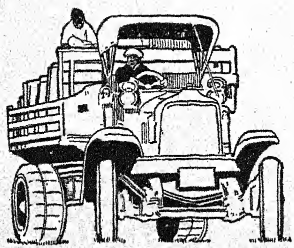
C. The Automobile and the Conquest of the Air

(The automobile, good roads, and the airplane: their effects upon living together.)

The achievements of man with steamships and railroads have indeed been wonderful. These servants have given us our main arteries of transportation. But they are, after all, only our main arteries. In the last generation we have supplemented them with two devices well known to all of us, the automobile and the airplane.

The automobile is only a generation old. We saw on page 249 that over 100 years ago persons were experimenting with engines that ran upon the ordinary highways. The work of Cugnot and Trevithick was especially interesting. But the time was not ripe for the automobile. It had to wait almost a century.

AN EARLY AUTOMOBILE

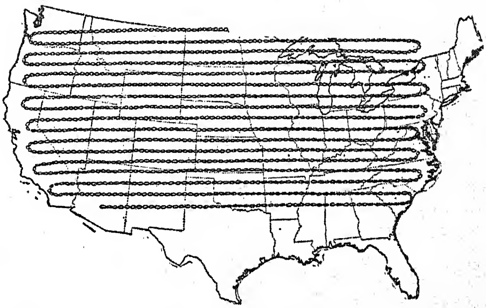


A MOTOR TRUCK

One reason why we did not have the automobile sooner was that we were too much interested in building railroads. A more important reason, however, was the fact that a steam engine was too heavy and clumsy for road purposes; a lighter and more convenient "power plant" was needed. As we know, this light power plant was supplied in the 1860's and the 1870's by the gas engine and the electric motor (see pages 119 and 120). Then came

many experiments with "horseless carriages" both in this country and in Europe. We do not need to work through the details of the invention of the automobile. We already know what we need to know for purposes of our story. Man, the harnesser of nature, harnessed her forces in the gas engine and the electric motor and then applied them to transportation.

Although young its influence is very great. — How very recent the automobile is may be seen from the fact that in 1896 there were only four gasoline-burning cars in the United States. Yet in 1924 we had over 15,000,000 motor cars and trucks. They have become a commonplace of travel and transportation in every nook and corner of the land. Making them has become one of our greatest industries; advertising and selling them is one of the largest items of our commerce.



OUR AUTOMOBILES
A procession of our automobiles would reach this far.

Already we are beginning to feel their effects upon our living together. Great fleets of motor trucks compete with the railroads in hauling produce to our larger cities. Other trucks deliver goods to our retail stores and to our homes. The passenger car makes a thirty-mile trip both shorter and pleasanter than was a five-mile trip twenty years ago. It has made the whole life of the farmer different, for he is no longer limited to a few miles from his doorstep. The passenger car and the motor bus carry thousands of city dwellers

to and from their work and then provide pleasure for leisure hours. The governments — city, state, and national — make use of this new device to aid the police, the sanitary forces, the army, and the mail service.

Automobile trips of hundreds of miles — even across the continent — are not unusual. Every summer one may see cars pass his door, bearing license numbers from practically every state in the Union. Quite aside from the pleasure these tourists get, we need to remember that such movement from place to place causes them to think of our land as one united country.

We are becoming a nation of good roads. — In a very real sense, the story of the automobile is also a story of good roads. Our roads of the 1880's and 1890's were probably the worst roads in any civilized nation. Gradually, however, as our railroad net filled out, we came to see that good roads were needed. The farmers found that bad roads either prevented hauling their goods to market at the right times or made that hauling very expensive. They saw that when good roads went through a district, that district rose in value, and they became more prosperous. The city dweller saw that good roads meant cheaper food supplies and added pleasure and recreation.

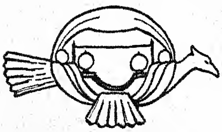
As a consequence, we began to pay more attention to our roads. Universities and business houses dealing in road-making material carried on tests and research in the best methods of road building. The Federal Government made grants of funds to states. State governments gave advice and money to local districts. Local governments increased taxes and issued bonds to get money for road building.

Although we are just getting well started at this work, the results are already good. Great trunk lines like the

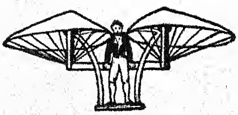
Yellowstone Trail, the Dixie Highway, the Lincoln Highway, and the Liberty Way stretch out through many states. Some states maintain "state" lines crisscrossing the whole state, and these are fed by improved "county" roads. When we reflect that on such roads the automobile may with safety run at a speed the passenger train of two generations ago could scarcely maintain, we see that the automobile and the good road are the fitting climax of our conquest of distance on land.

OUR SURFACED ROADS WOULD REACH AROUND THE WORLD 20 TIMES

And then came the airplane. — Next came the conquest of the air. Men have always wished to fly. They have watched the birds and envied their swift motion and easy pathway through the air. How much easier it would be, they have thought, to fly than to walk slowly over the ground. In the stories they invented for their children, there have always been seven-league boots and magic caps and magic carpets that easily carry their owners as on wings over great distances.[1]



EARLY IDEAS OF HOW TO FLY



But when it came really to conquering the air, man found it a hard task. His body was much heavier than the air, and he had no wings. How was he to keep aloft? Here also the answer was to come through

[1] Lesson C-1, *Lessons in Community and National Life.*

the light "power plant" of the gas engine. It was able to drive a machine with planes, or flat surfaces, slightly tilted so that the pressure of the air (which we had known about since the days of Torricelli, see page 113) would cause the machine to rise. With steering apparatus added, the problem was solved.

The American, Langley, made some of the important pioneer experiments in aviation. Two other Americans, the Wright brothers, made the airplane a practical machine. The first successful flight in an airplane driven by a propeller was on December 17, 1903, over the sand dunes of Kitty Hawk, North Carolina. The flight lasted for twelve seconds. By the next year they were able to make a turn in the air. On October 17, 1905, they made the first flight that lasted over half an hour. It was for 33 minutes and 17 seconds.

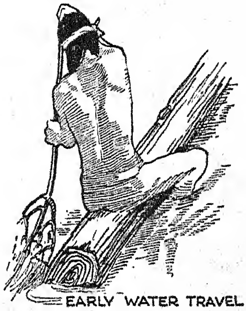
With that as a beginning, man has conquered the air. He has exceeded the speed of a bird, and he cuts capers in the air that no sane bird would try. The airplane has become the scouting machine as well as a battle machine of war. It has crossed the Atlantic; it has crossed our continent; it has soared around the world. For fast freight and mail it has no rival. It is used not only for emergency passenger travel and recreation but also for regular passenger traffic. What the future may have in store for it we can hardly guess.

There are three eras in man's conquest of distance by transportation devices. — A review of the story of man's conquest of distance shows that there have been three periods or eras in that task:

1. *Before neolithic man.* — The first era lasted through long thousands of years, down to the time of neolithic man. Man had to depend upon his own legs for walking and upon his arms for paddling. The sandal, the moccasin, the carrying stick, and a rude boat were his best tools.

2. *From neolithic man to 100 years ago.* — With neolithic man the second era began. Neolithic man found multipliers by taming animals for transport on land and by harnessing the winds for travel on the waters. Then came slow additions resulting in the wheeled carriage on land and the sailing vessel for the seas. But as late as 1834, an English statesman, needing to make a hasty trip from Italy to England, made no better time than Cæsar (102–44 B.C.) could have made.

3. *The last hundred years.* — The third era began only a little over a hundred years ago — almost in the memory of men still living. It is the era in which man, the harnesser of nature, makes nature's powers fetch and carry for him. Man, building on his progress of the past, has harnessed steam and electricity in such devices as (a) the steamship, (b) the steam and electric railway, (c) the automobile, and (d) the airship. With these he shuttles and scuttles about at dizzy speed. Four hundred years ago Magellan's crews went around the world in three years. It could be done to-day in forty days, using just our regular ways of travel. It could be done in less if one were out to make a record.


EARLY WATER TRAVEL

Before we go on to our study of the next section, let us free our minds of the necessity of remembering dates by making another chart similar to the one on page 84. A good heading will be:

SIX HUNDRED YEARS OF CONQUERING DISTANCE BY TRANSPORTATION DEVICES

On this chart let us insert the dates and events mentioned in pages 244 to 258. It is then ready for the notebook.

D. Electricity Annihilates Distance in Message Sending

(The telegraph, the telephone, the wireless.)

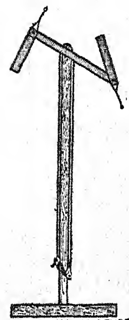
The steamship, the railroad, the automobile, the airplane have enabled us to "shrink the earth" until a person living to-day is more familiar with the whole world than one living five hundred years ago was with his local province. But even these multipliers of his powers have not satisfied man. Even the speed of the airplane is not fast enough for his messages. From very early days he has tried not merely to conquer distance but to annihilate it; to send his messages great distances with practically no loss of time. The story of how he has done this is the story of the telephone, the telegraph, and the wireless. It is told in the next few pages.


SMOKE SIGNALS

Early ways of sending messages continued down to a hundred years ago. — As is true of so much of human progress, the story of the rapid sending of messages goes far, far back in human history. We are told how more than 3000 years ago the news of the capture of a city was sent by a chain of beacon fires built on mountain tops. We are told how more than 2000 years ago rows of torches, by being first hidden and then displayed, flashed messages in a way not greatly different from the Morse alphabet of to-day. The Indians of our own plains were skillful in sending messages of smoke by day and fire by night. Then, too, there was the invention of the

three Chappe brothers of France who in 1791 sent messages to one another by mounting long arms of wood on posts and making the angles stand for letters of the alphabet. We still use a similar device to-day in the semaphores of our railroad and in the flag signaling of the Army and Navy. One should mention, too, the heliograph. This is a mirror shaped so that the rays of the sun can be reflected. Messages are sent by the flashes as far as one hundred miles.

We have in message sending another case where from the time of neolithic man until recently very slow progress was made. Man could send messages almost as rapidly in the days of the neolithic savage as he could in the year 1840. And these neolithic ways of sending messages are not entirely satisfactory. Most of them are useful only for short distances and become useless if they cannot be seen. In fog or in storm, they cease to be helpful. They cannot be sent around a corner; they must go in a straight line. They are very poor as compared with the telephone and the telegraph. But we could not have the telegraph and telephone until man had become a scientist and had harnessed electricity.



CHAPPE MESSAGE SENDER

How electricity was harnessed for message sending. — In just what ways man has harnessed electricity is a story which must be told by your science teacher. For our purposes, we need to know only the more important steps.

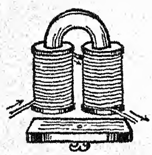
1. Over 3000 years ago the Greeks found that when the yellow substance, amber, was rubbed, it attracted light things, such as bits of straw. The Greeks had no idea what caused this. They concluded that there was "life" in amber; that there was an "amber soul." We know to-day that the rubbing caused electrification, and that electricity

made the straws cling to the amber. This work of the Greeks marks the beginning of knowledge of electricity.

2. Along about 1600 A.D. two scientists, Gilbert and Guericke, found that many other substances would act the same way as amber. Sparks of electricity were actually "made" by rubbing certain substances together. This was a real beginning of harnessing electricity, for man could now, at his will, cause electricity to display itself.

3. Two hundred years went by. Then a scientist, Volta, made a pile of strips of two different kinds of metal with acid-moistened cloth between the strips. From this he got a *continuous* current of electricity as compared with the occasional sparks made by friction. This was, of course, a great step forward in harnessing electricity. At about the same time another scientist, Gray, discovered that electricity could be led, or conducted, from one place to another by the use of metal wires. This was another great step forward.

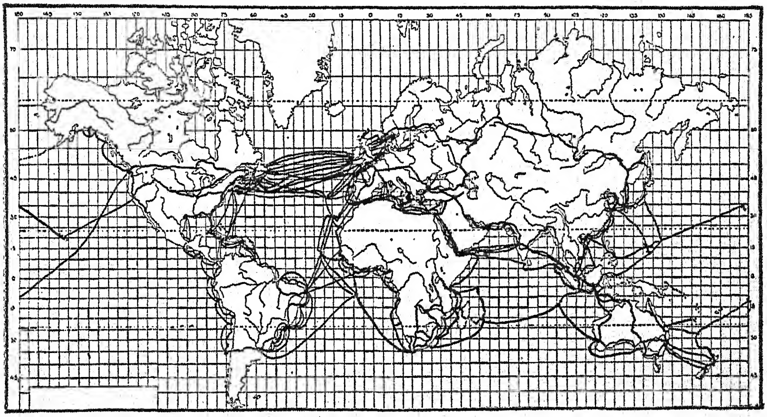
4. Then in 1818-1823, through the work of Oersted and Sturgeon, it was discovered that if a wire were wound around a bar of soft iron and an electric current turned on, the bar became a magnet as long as the current remained on. Much use of this fact was later made in the telegraph and telephone.



5. In 1831, Faraday discovered how to make electricity continuously and in great quantities by means of the dynamo, (see page 120). Electricity was thus made a cheap and dependable servant.

Early experiments resulted in the telegraph of Morse.—When these things had been done, the time was ripe for some genius to put together the store of knowledge that had heaped up, make a few additions, and have the electric telegraph. A really scientific explanation of the telegraph

("telegraph" comes from two Greek words and means "far writing") would require much space. We can see the essence of the matter, however, by following the Scotchman, who explained it to his friend thus: He asked his friend to imagine his dog being stretched and stretched until he reached from Edinburgh to Glasgow, the tail being in Edinburgh and the head in Glasgow. He then pointed out that



THE MAIN CABLE AND TELEGRAPH LINES OF THE WORLD

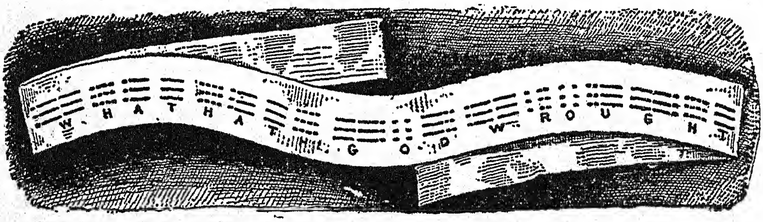
if someone should step on the tail in Edinburgh the dog would yelp in Glasgow. "Now," so the Scotchman said, "it is not convenient to stretch a dog such a distance, so the telegraph people use a wire which seems to act just as well."[1]

In other words, what we do with the telegraph is this. We start an impulse at one end of the line, and this is carried at tremendous speed to the other end of the line. At this other end is a bar of soft iron with a coil of wire around it. When the electricity is turned on, this bar becomes a magnet, and draws to it a little piece of iron so adjusted that

[1] Gibson, *Romance of Modern Electricity*. (Seeley, Service & Co., Ltd.)

it clicks. When the electricity is turned off, a spring draws the click-producing iron back in place for the next click. All that remains is to work out an alphabet of short and long intervals between clicks (dots and dashes), and the modern telegraph has been made.

An American, Morse, is usually given credit for the invention of this kind of telegraph, although there are others who claim the honor. In 1837, he sent a message through more than three miles of copper wire. After several years of persuasion, Congress gave him a grant of $30,000 to build a line from Washington to Baltimore. In 1844 the line was completed and carried as its first message the now famous sentence, "What hath God wrought." It took some time to



Courtesy of McLaughlin: History of the American Nation, (D. Appleton and Co.).

THE TAPE OF THE FIRST TELEGRAPHIC MESSAGE

persuade the people that the telegraph was a really useful instrument and not a toy, but as time went on it came to be used more and more. To-day the extent of its use is almost beyond description.

Of course, the cable is a telegraph wire stretched under the ocean. However, the difficulties connected with getting a line strong enough and with insulating it so that electricity would not be carried off by the water were so great that it was not until 1858 that another American, Cyrus W. Field, laid the first trans-Atlantic cable.

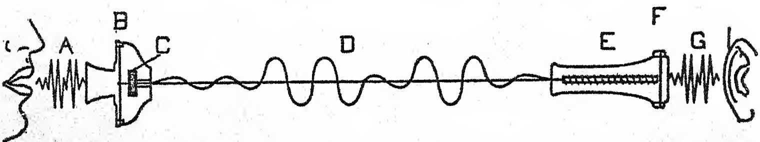
The telephone enables us to send sound great distances.— In 1877, advertisements were distributed in various cities of an exhibition of a new marvel. The telephone ("telephone" comes from two Greek words and means "far sound") had just been made a working instrument. It was so new and strange an instrument that people flocked in hundreds to hear Alexander Bell, the inventor, tell of its wonders.

A year before, there had been a famous Exposition at Philadelphia to celebrate our country's one-hundredth birthday. Back in a small dark corner of the educational exhibit was Bell's telephone. One day, when the judges were inspecting the various exhibits, Bell was greeted warmly at his booth by the Emperor of Brazil, Dom Pedro de Alcantara. He had met Bell years before, when Bell had helped him make plans for a deaf-mute school. The fact that an Emperor knew Bell interested the judges, and they drew towards Bell's booth. Bell took up the transmitter and gave Dom Pedro the receiver. By this time the fifty judges had gathered around, close enough to hear Dom Pedro exclaim in great excitement, "My God, it talks." Then came the scientists to see if it really did talk. They, too, were amazed. For the rest of the time, the "talking machine" was the most popular exhibit at the exposition.

The basic things in the telephone.— As is true of other devices, the telephone dates far back in history for its beginnings. Long, long ago in ancient India, men talked with one another at some distance by using a device very much like that used by boys to-day when they attach tin cans to the ends of a firm string or a wire and talk to one another. The string or the wire carries the vibration of the voice. In the telephone, electricity is harnessed to carry these vibrations.

Bell, the inventor of the telephone (he was but one of several who were working the problem out) finally saw that

if the vibrations of the voice were made to strike against a thin metal disk, this disk would also vibrate. He found a way to have these vibrations of the disk affect an electric current. This current would go over a wire. He also found a way to change the impulses of this current back into vibrations in another disk at the other end of the wire. The telephone of to-day, has, therefore, these essential parts: (1) a transmitter, (2) a vibrating disk starting electrical impulses, (3) a wire to carry the impulses, and (4) a receiver at the other end that turns the electric impulses back into disk vibrations. These are heard as the sound of the voice.



Courtesy of the American Telephone and Telegraph Co.

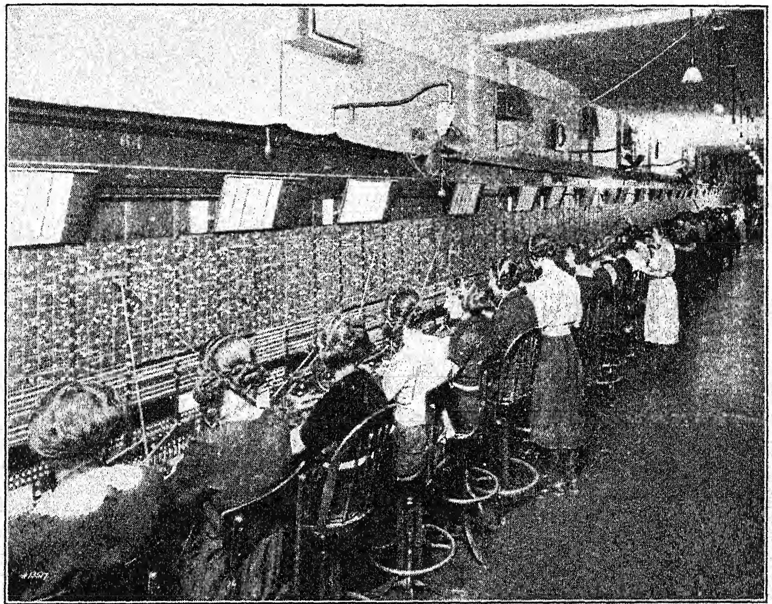
HOW WE TALK THROUGH THE TELEPHONE

The voice sets up vibrations in the air (A) in front of the mouthpiece. These cause the diaphragm (B) in the transmitter to vibrate in its turn. This vibration causes bits of carbon (C) in the transmitter to change their positions slightly. This change causes a variation in the electric current flowing through the circuit (D) to the receiver of the distant telephone. These electric vibrations coming to the receiver pass through the coil (E) and cause the magnet within the coil to exert pulls upon the iron diaphragm in the receiver (F). This sets up vibrations in the air (G) at the ear of the listener and these vibrations are identical with those made by the voice of the speaker in the distant transmitter

The increasing use of the telephone. — It took Bell and his friends years to get the device ready to be widely used. For example, some way had to be found for multiplying the number of people who could be reached. The first telephones reached just from one house to another. Later all the wires were led to a central place (now called the telephone exchange), and a system was worked out by which a telephone user calls the exchange, and the exchange connects him with any other telephone subscriber.

Another hard problem was that of carrying the messages for a large number of miles. However, within eight years

after the invention of the telephone, "long distance" telephoning was possible between New York and Boston, a distance of 235 miles. In 1892 Chicago was connected with New York. By 1913 New York could reach Salt Lake City,



Courtesy of the American Telephone and Telegraph Co.

A TELEPHONE EXCHANGE

and finally in 1915 she was able to talk with San Francisco and the other west-coast cities.

What the annihilation of distance has meant. — We are so accustomed to the telegraph and the telephone and the cable that we never stop to think what they mean for our living together. But let us ask ourselves a few questions. What difficulties would our modern hotels and skyscrapers have if there were no telephones? Could we operate our

railroads as well or as safely? Do we ever use the telegraph or the telephone in highly important ways in times of crisis, such as fire, sickness, or theft? Do they help the business man who has branch houses all over the country? Do they mean a better life for the farmer? Are they useful in time of war? Do they help gather the news we read in the paper? Do housewives live in a different way because of them? Do the police protect us better because of them?

Is it not clear that they have "placed all mankind within earshot of one another"? Messages have been sent around the earth in twelve minutes, and that time can be greatly reduced. Indeed, if all connections were made a message could go around the world in less than one second! As a practical business matter, a man in one of our large cities to-day can reach a friend in any other large city anywhere in the civilized world in an hour's time, if he has reasonable luck. The whole world is everyone's back yard.

RADIO WILL CARRY COOLIDGE'S MESSAGE TO MILLION AUDITORS

Washington, D. C., Dec. 5.—The voice of President Coolidge, addressing congress tomorrow, will be carried over a greater portion of the United States and will be heard by more people than the voice of any man in history.

"Listeners in the largest of auditoriums number less than 30,000; but an ordinary radio audience for any one of the big broadcasting stations on an ordinary occasion is 300,000. But in the event of the President of the United States making an address over radio, there would be an audience of at least 15,000,000 people.

Mr. McDonald asserts that with 15,000,000 persons hearing the President's voice and as many more seeing him in motion pictures, there is no use of Mr. Coolidge, or any future President, wasting strength and energy in traveling about the country appearing before and talking to comparatively small groups in various places.

The wireless. — Within the last few years the work of electricity as the carrier of messages has been extended to the wireless. In 1896, Marconi took the first steps in the development of the practical wireless, although the principles on which it is based had been discovered by Hertz eight years before. For a time the development was slow, but to-day anyone can purchase a few of the more difficult parts, and then can make for himself at a cost of a few dollars a

wireless receiving station enabling him to listen to conversations, lectures, and concerts from all over the country. I know a boy who sits in his room in Chicago working a set that he has made. A turn or two of his dials, and he listens to a concert at a station in Schenectady; another turn or two and he listens to a song from Cuba; another turn and he hears a lecture being delivered in San Francisco; more adjustments, and operas, weather reports, daily news, children's stories, and bedtime stories can be heard from Boston, New York, St. Louis, Minneapolis — any place he chooses. One night he listened to the President of the United States who, seated in Washington, *was talking to the whole American people.* What hath God wrought!

Let us again make a chart for our notebooks similar to the one on page 84, this time using the heading:

SIX HUNDRED YEARS OF ANNIHILATING DISTANCE IN SENDING MESSAGES

What does the chart show?

Summary of the conquest of distance.—Truly man is a communicator and a multiplier of communication. He talks; he writes; he multiplies his written language by printing. He multiplies his powers to reach others by conquering distance in his transportation and by annihilating distance in his messages.

Certain points stand out clearly.

1. It is his ability to harness nature that has given man such power of communication. This chapter has only applied the story of man's control of fire, metals, power, machines, and science to his communication. That fact gives us a hint of what we may expect of the future.

2. Our great multiplication of communication has made us really a people of the *United* States. We are united by

language, by means of transportation, by trade, by messages as no other great mass of people has ever been united in such a huge territory. If one can imagine the map of the railroad net (see page 253) set on top of another map of our really good roads of to-day, and this set on top of another map of the telephone and telegraph lines, and this on top of another map showing the distribution of our newspapers, he begins to see something of the way we are knitted together.

Courtesy of the American Telephone and Telegraph Co.

THE UNITED STATES AND EUROPE

Good communication is one reason why we are a united country.

3. And it is all so recent. It is so new that the thought fairly takes one's breath. We have barely begun to live together in our present ways. We say that we are living in a new world.

PROBLEMS

1. Define or explain:

Conestoga wagon	Prairie schooner
Flatboat	Volta's pile
Turnpike	The Rocket
National pike	The Clermont
Stagecoach	Electromagnet

2. The Romans had been very good road builders. How do you account for the fact that the roads of Europe in the seventeenth century were poor? Give reasons why our own colonial roads were so poor.

3. Why was the Erie Canal the most successful canal? Make a list of the things it meant for the western people. For the eastern people. Why is a canal that connects two large systems of water routes likely to succeed better than one not thus located?

4. Why was the steamboat so important for the western settlers? What did it do for them?

5. Give as many reasons as you can why a voyage around the world would be safer and quicker to-day than it was in Magellan's time.

6. What things can the railroad do better than the steamboat?

7. Draw up a list of points comparing travel in a stagecoach with travel in a Pullman car. Include, among other things, speed, eating, sleeping.

8. A seventh-grade boy, watching a great locomotive pull into a station beside him said, "Well, I begin to see what the men in the engine cab are doing for me." Do you?

9. How does roadmaking to-day differ from that of Boone on the Wilderness Trail?

10. Why is it better to have a whole state plan and supervise its roads than to leave the matter to the villages and townships? Who owns the highway?

11. Talk over with others the ways in which the automobile has made life different. Has it helped in getting work done? In recreation? In time of sickness?

12. "The railroad, steamship, airplane, and automobile are great educational agencies." How so?

13. What were the great channels of communication to the Middle West before 1820? What were they thirty-five years later?

14. For what business purposes is the airplane suited? For what war purposes? For what recreational purposes?

15. Go back over the steps in the harnessing of electricity (pages 261 and 262). Explain the significance of each as a preparation for the telegraph and telephone.

16. In what ways does the telephone aid a business man in a city? A farmer? The police? A newspaper? Does the telephone benefit you when it aids the above?

17. Make a list of instructions on the proper use of the telephone.

18. Make a visit to the nearest telephone exchange and write a description of what you see.

19. "Machinery has increased the possibility of exchange of goods and ideas." Show how.

20. It is said that the diet of an American is more varied than that of the people of any other nation. How do you account for this? What are its consequences?

21. What inventions help unite people in a nation? What inventions help bind country people to city people?

22. "Uniformity of speech, customs, and manners is a result of communication in the United States to-day." "Local peculiarities of speech, manners, and customs are likely to diminish." How does communication tend to have this result? Why is this result important?

23. "Modern changes in communication have made many aspects of our living together very different." Cite cases.

24. "The United States gives a great opportunity to a manufacturer because it is all one huge market." Why is it all one huge market?

25. Notice the eras of transportation mentioned on page 259. How do you account for the fact that the second era is so much longer than the third? In which era has most been accomplished? Are you sure?

26. Make the charts called for on pages 259 and 269.

27. Answer the questions at the beginning of this chapter, page 237.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter VIII.

1. How Nature Affects Primitive Transportation (an example of the importance of nature in our living together).
2. Cyrus West Field (a life of devotion to the idea of laying the Atlantic cable).
3. The Mastery of the Air (a quite recent chapter in the story of man's conquest of distance).

See also:

Chapter XI, 2. Good Roads (a realm of communication in which we have recently made much progress).

Chapter XI, 3. The United States Post Office (one way the government aids in developing communication to-day).

Problems to think over are given in these reading selections.

CHAPTER IX

MULTIPLICATION OF POWERS THROUGH TRADE: MONEY, THE LANGUAGE OF TRADE

A. Multiplication of Powers through Trade
B. Money, the Language of trade

Questions to Keep in Mind while Reading This Chapter

1. How does trade multiply man's powers?
2. How is money a multiplier of man's powers?
3. How old is our trading and our use of money?

A. Multiplication of Powers through Trade

(How trade helps us to live better; why modern trade is so large.)

Trade is a multiplier of man's powers. — When man, the communicator, conquered distance with roads, steamships, railroads, airplanes, and automobiles, and when he annihilated distance with the telegraph, the telephone, and the wireless, he made possible a great increase of trade. Trade is another multiplier of man's powers. It enables him to get many things far more easily and better than he could get them without trade. That means greater ability to live well.

Trade enables us to get goods we could not otherwise have. — A group that did not trade could have only the goods produced in its own territory. That might mean poor living. For example, a sandy desert cannot raise the food supplies so easily grown on the plains of Illinois; the plains of Illinois cannot produce the borax so easily secured in one of our deserts; the temperate and frigid regions cannot produce many products of the tropical zones. So it goes,

the whole world over. Man was greatly handicapped when he could have only the goods produced in his own locality. Fortunately, to-day he has conquered distance. He trades with others. He draws upon the resources of the whole world. Surely that is a great multiplication of his powers.

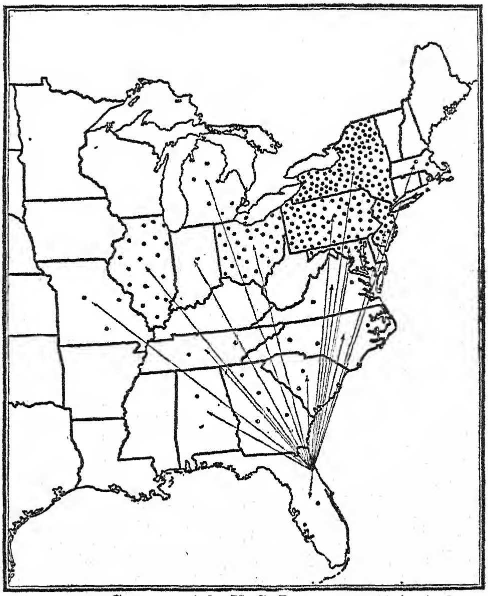
Trade enables us to get goods more cheaply than we could otherwise get them. — Even when it is *possible* to raise or make a certain thing in our own locality, it is often *easier and cheaper* to get it elsewhere through trade. It would be possible, for example, to build expensive greenhouses in such states as Ohio and New York and raise tropical fruits. But that would be an expensive and wasteful way for the people of these states to get their oranges, bananas, and early vegetables. It is far better for them to raise wheat and corn; to manufacture plows and shoes; to make clothing and flour; and to do the many other things their climate and resources enable them to do easily and well. They can then trade some of these products for the fruits of California and Florida. All regions concerned get the goods they wish more easily and cheaply through such trading. This is only another way of saying that trade increases man's power to live well.

Courtesy of Selfridge and Company.

TRADE, A GODDESS OF PLENTY

Trade enriches our lives and widens our mental horizons. — Everyone who has studied domestic science knows how

important it is to have a diversified diet. It "tones up" the whole body. It gives health and vigor for work. Now the stomach is not the only organ that gets a "diversified diet" as a result of trade. The brain does also. Because of trade, messages go to the brain through our eyes and ears, telling of strange goods and persons from all over the world. Someone said, "I was not the same person after I bought an elephant's tusk from India and a lion's skin from Africa." That is a picturesque way of saying that trade is one of the ways by which we come into touch with the rest of the world; one of the ways by which our minds reach out and grasp new ideas. Of course, when trade does this, it increases our powers; it gives us greater ability to think and to plan; it makes our lives fuller and better.



Courtesy of the U. S. Department of Agriculture.

EARLY POTATO SHIPMENTS FROM FLORIDA

This shows shipments from one district only. Each dot represents ten cars.

Early trade was meager. — Trade is another of man's devices that reaches back beyond the time of neolithic man for its scanty beginnings. These scanty beginnings were, of course, foundations upon which the later development of trade was built. But it is fair to say that trade has come to

be used as a really great multiplier of man's powers only in the last two hundred years.

Our account of how slowly good means of transportation and communication developed for thousands of years after the time of neolithic man lets us see that trade and commerce must have developed slowly also, for trade depends upon transportation. Of course, through these thousands of years slow additions were made to man's trading powers. Indeed, as we study history we find that there were several little spots on the earth where trade became somewhat important, just as there were several little spots where sciences grew and books were made. But after all, these early trading nations — such as the Babylonians, the Phœnicians, the Greeks, the Romans, and the Italian cities — *were* little spots of the earth. The great masses of the world's peoples were not touched by them.

Courtesy of Selfridge and Company.

East Meets West in Trade

Then, too, even in these trading nations, trade was not nearly so important as it is in our living to-day. In most cases, these peoples lived in groups called "patriarchal families." Each family group was largely self-sufficing, as was the gens of the Iroquois discussed on page 39. Such trading as took place was mainly in silks, spices, perfumes, precious metals, and other comforts and luxuries for the

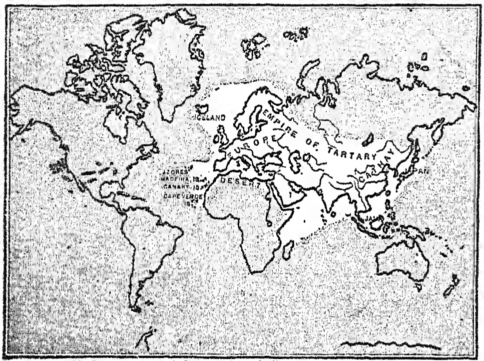
rich. There was not much trading in ordinary goods for common people or for slaves. The patriarchal group as a whole bought and sold little; the humbler members of the group bought and sold almost nothing. In other words, in these trading nations, the life of the masses of the people was not organized on the buying and selling plan; it was organized on the plan of "make it and use it yourself."

As recently as 400 years ago there was little trade. — But let us leave these trading nations and take a look at the life of our mother country, England, only 400 years ago. There were few cities. There were no scattered farmhouses such as we see. Nine tenths of the people lived in little groups called *manors*, or *vills*. Except for the lord of the manor and his family, the people of a vill knew or cared little what went on in the rest of the world. They lived in old customary ways that had come down to them through the centuries with almost no change. The lord of the manor would occasionally buy some silks and spices, a purse, a hat, a girdle, a pewter pot, a pair of gloves, some salt for curing meat, some tar as medicine for the sheep, or some iron (see page 92) to parcel out for the scanty tools and weapons. But the ordinary people did almost no buying and selling. They lived on day after day, year after year, raising or making nearly all their own stuffs. It was a dull, stupid, unchanging way of living.

It is true that in the towns, where perhaps one tenth of the people lived, there was a town market on certain days of the week, and there was also some buying and selling at the little shops, as we saw on page 132. But many of the townsmen cultivated land and raised their own stuffs. There was nothing like the bustling, enormous trade of a modern city. Then, too, at a handful of places there were held "fairs" for a few weeks, once or twice a year. These

were busier trading places. Foreign merchants came to them with their wares. But think how meager this *occasional*, or periodic, trading was as compared with the *continuous* trading of to-day. Man had not yet learned to be a great multiplier of his powers through trade.

Why early trade was so meager. — It often helps us to understand the conditions of our life to-day if we see why earlier people did not have them. Let us, therefore, see why the trading of only a few hundred years ago in England was so small.



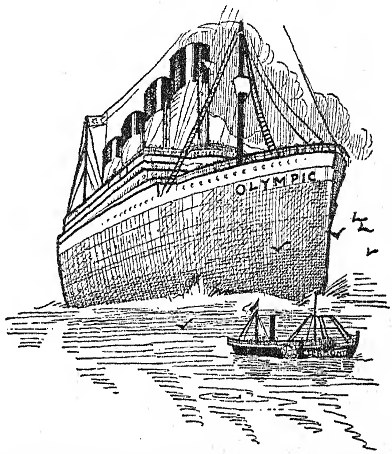
Courtesy of Beard and Bagley: The History of the American People

THE WHITE PART SHOWS THE KNOWN WORLD OF THE FIFTEENTH CENTURY

1. To begin with, *people did not know much about the rest of the world* or about goods from other places. The common man lived and died in his own little hamlet. He seldom saw goods from other lands. People from the nearest town were to him foreigners and almost enemies. Even the rulers, scholars, and traders knew little of the world as compared with what we know to-day. Above is a map showing the known parts of the world before Columbus made his famous voyage. How limited the people of that time would be in their knowledge of places where interesting goods could be secured! We must remember, too, that there were no public schools, few printing presses, no public mail systems, no newspapers — few of the information spreaders that are so common to-day. Trade with other lands would not be large under such conditions.

2. In the second place, *the means they had for carrying themselves and their goods from place to place were poor and even dangerous.* On land the merchant must carry his pack or lead his pack horse. The roads were worse, if possible, than our own frontier roads. Traders often fell through the few tottering bridges or were drowned at the fords. Their pack horses sank out of sight in the mire. Could land transport and trade flourish under such conditions?

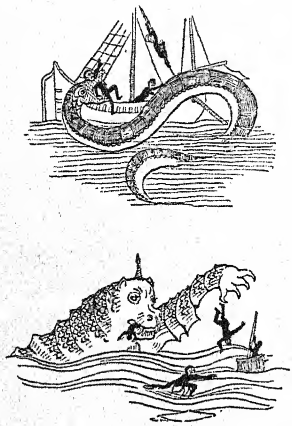
On the sea, conditions were better, but they were far from good. The wooden sailing vessels of the time were small and frail. It would take a fleet of them a year to carry as much as a single freighter takes on a single voyage these days. Chances were hardly even, furthermore, that these ships would ever return from a long voyage. Shipwreck always threatened, and bad food supplies and bad sanitary conditions often caused more than half of a ship's crew to die of disease during a long voyage. It must be remembered, too that until after the invention of the compass and the astrolabe (a device for finding latitude), sailors who were long out of sight of the land could not know just where they were or precisely in what direction they were going. There was lack of maps and lack of knowledge of winds and currents. It was a bold master who sailed his ship beyond the sight of land in those days.



PROGRESS OF THE LAST 100 YEARS

Think what the sailing ship of 400 years ago must have been.

3. *There were dangers, too, arising from the weak governments of the time.* To-day, the government with its armies and navies and policemen make it safe for traders to carry on their work. It was far different in the old days. Governments were weak, and they did not concern themselves greatly with trade in any event. The result was that on the roads robbers and even the lords of the manors plundered the traders. On the rivers and seas there were pirates. The trader who escaped the pirates had his troubles when he dealt with a foreign people, for they were quite likely to regard him as an enemy. If they did, his own government would probably not help him.



Imaginary Terrors of the Sea

4. Added to these real dangers were *the foolish fears and superstitions haunting men of those days.* Science had not yet explained the world. Unknown lands, so men thought, were peopled by goblins and monsters against which puny man could do nothing. Over the unknown seas, men said, hovered huge vultures that could lift a ship in their claws as easily as a hawk could lift a mouse — and the finish of the sailor would be worse than that of the mouse. Since they thought the world was flat, there was, of course a "jumping-off place" over which too venturesome ships would be dashed. There were huge rocks or cliffs which clashed together and smashed ships between them. There were serpents for which a ship would be but a light breakfast. There were — but why go on with the list? It is as long and as terrifying as the imagination of ignorant

man. A mind full of foolish fears and superstitions was an unfortunate mind for traders to have.

5. Finally, *the whole way of living and thinking of the people was on a nontrading basis*. If the people of that time had known what trade would have meant to them, they might perhaps have overcome the other difficulties. But they did not know. They had always lived in self-sufficing groups and all their thinking was in terms of that kind of life. As we look back at their living we see that it was a very poor living, for we can compare it with what we have to-day. But they knew of nothing better. It never entered their heads to strive for the better living which would come from trade. They went on living as people always had lived.

Man's progress as a harnesser and communicator enabled him to be a great trader. — Our study of man, the harnesser of nature and the communicator, has already shown us how all this was changed. All we need to do is to look at the charts in our notebook. They will bring back to mind what has happened.

Beginning with the great discoveries, of which the voyage of Columbus in 1492 was but an example, man began to increase his knowledge of other lands and other goods. At first his knowledge grew slowly. As the charts show, the last one hundred and fifty years are the years of abundant printing, widespread education, conquering distance, and even annihilating distance. They are the years in which the world has shrunk until "it is everyone's back yard."

The charts show the same story concerning man's means of carrying himself and his goods from place to place. Within the last one hundred and twenty-five years his steamships, railroads, and auto trucks have enabled him to transport for great distances the ordinary things of life—sand, coal,

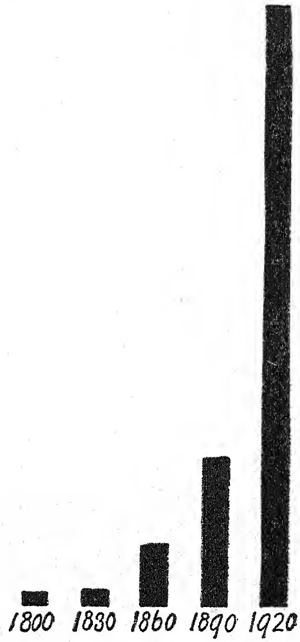
lumber, stone, machinery, and clothing—things that affect the living of every one of us. The poorest, humblest citizen of to-day is more affected by trade than was the noble or the rich man of earlier times. A network of communication (see page 270) reaches and serves every one of us.

Quite as wonderful a change has taken place in our ways of thinking. We know how the "rebirth of learning" (page 164) began to shake men's minds out of their old customs and ways. That work was continued by the geographical discoveries, the printing press, and the development of science. While our minds to-day are not entirely free of foolish fears and superstitions, they are far more free than they were only a few hundred years ago. To-day an unknown region does not fill us with terror; it invites us. We like to explore. To-day a new way of acting or thinking does not cause us to shrink; it whets our curiosity. We want to learn new and better ways. To-day no one would dream of trying to live in a little self-sufficing group, making all the things he consumes. We wish and expect to reach out for the resources of the whole world.

FREIGHT FOR ONE FAMILY FOR ONE YEAR

The recent enormous progress in trading. — It will be easier to show the great increase of trade during the last few generations by a chart than by words. Let us look at the chart (on the opposite page) showing the increase that has taken place in the trade among the different peoples of the world since 1800. What an astounding increase there has been! Now that we know that trade increases man's ability to live well, the chart becomes not merely a chart of trade but a sort of picture of man's progress.

But this chart of trade among different peoples (foreign trade) is but the merest beginning of the story. The trade that occurs *within* a nation (internal, or domestic trade) is far greater in quantity than its foreign trade. We have no record of our nation's internal trade. We cannot get exact figures, but we know they are enormous. Everybody is a "trader" to-day. Everybody specializes at one task and trades his goods or services with others. The result is that we are to-day a trading, or "market" society, as compared with earlier self-sufficing societies.



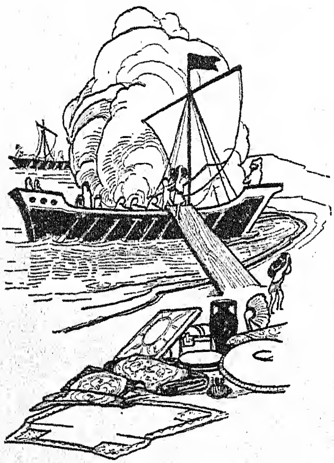
GROWTH OF THE WORLD'S TRADE

We may summarize our study of the multiplication of man's powers through trade, or the use of the market, thus: Trade multiplies man's powers because it enables him to get goods he desires far more easily and cheaply. It places the resources of the world, rather than those of his petty locality, at his command. Although men living before neolithic times had the beginnings of trade, and although there have been several fairly important "trading nations" in history, the last one hundred and fifty years have been the ones during which man's ways of living have been most rapidly revolutionized by trade. In the case of trade, as in so many other cases, there was but slow progress for thousands of years after the time of neolithic man. In the last few generations progress has been by leaps and bounds.

B. Money, the Language of Trade

(What money does; its forms; credit and our financial institutions.)

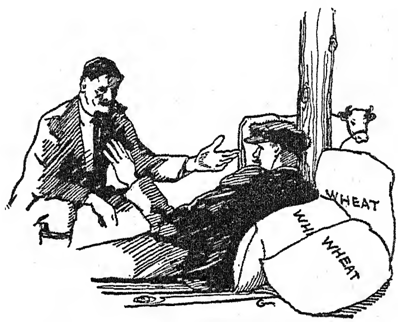
Barter is a slow, awkward way of trading. — We saw on page 45 that the Iroquois carried on their trade in a very clumsy way. They called it an "exchange of gifts." The name we give it is "barter." Barter means the "swapping" of one product for another without the use of money.



In the early stages of man's progress, barter was his only method of trading. Various schemes were used. In the long-ago days of Carthage, we are told, the Carthaginians bartered with some of the natives of Africa thus. The Carthaginians would sail up to the shore, unload their vessels, and spread the goods out on the shore. They would then go back on board and raise a great smoke, as a signal to the natives. The natives would come down to the shore, look the goods over, spread out their own wares, and then withdraw. The Carthaginians would come back and take a look. If they were satisfied they left their goods, loaded the natives' wares on board ship, and sailed away. If they were not satisfied they went on board again and waited for the natives to add more to their layout. Eventually, the trade was made, but what a slow, awkward way of trading it was!

Barter to-day would be almost as slow and awkward a way of trading as it was in the days of Carthage. Suppose there were no such thing as money and John Smith has a

cow he wishes to trade for wheat. He makes inquiries and finds several persons who would like to get his cow, but they have no wheat. He finds others who would like to sell wheat, but they do not want a cow. After a long search he finds James Riley, who happens to have wheat to sell and who wishes a cow. But now a new trouble arises. After much dickering, they conclude that a cow is worth fifty bushels of wheat, but Smith can use conveniently only twenty-five bushels. He must now set out with the other twenty-five trying to find someone who happens to want wheat and also happens to have something Smith cares for. Even if his search is a lucky one, he is likely to find himself in the same old trouble of making the quantities come out even.



BARTERING

Money, the language of trade, is a multiplier of our powers. — But notice now how simple it would be for Smith if money existed. He could take his cow to market and sell her for, say, $75. There were plenty of persons who wanted his cow, you will remember. Then he could take his money and buy the twenty-five bushels of wheat that he wished at $1.50 per bushel. There were plenty of persons who were willing to sell wheat. He would have $37.50 left to buy other things he needed, or to put aside for future needs. The use of money would certainly have saved Smith a great deal of time and trouble.

Money really is one of our communicating devices; it is the language of trade. We use it to say how much we want

a thing, or how much some one must give us for something he wants. Barter exchange is like talking with signs and gestures; it is slow and clumsy. Money exchange is like talking with words; it is quick and accurate. It is one of the devices by which man, the communicator, has multiplied his ability to communicate.

COMMODITY MONEY

Gold has come to be used as the basic or standard money. — Like so many of man's devices, money is really a very old one, but its greatest use has come about in the last few hundred years. Let us see how this has happened.

The difficulties of barter were seen even by primitive people. All over the world men who did even a little trading slowly came to use some one thing, or good, as a language of trade. All sorts of goods have been thus used. Some peoples have used beaver skins: a thing was worth so many beaver skins. Others have used cattle or sheep or wheat or tobacco or dried codfish or fishhooks or little bars of iron or the red scalps of woodpeckers or strings of polished shells called "wampum." Gradually, through the centuries, it came to be seen that some things were a better language of trade than others, with the result that the nations of the world have come to use the precious metals, especially gold, for this purpose. There were good reasons for deciding on gold. Gold has a good deal of value for its weight and is accordingly fairly convenient to carry around in trading. It does not rust, so it can be kept a long time. It can easily be

divided into smaller parts or hammered and melted into larger chunks and is thus convenient for buying goods requiring either much or little gold in exchange.

For the present, then, let us think of money as little chunks of gold used as "counters," or "tickets," or "communicating devices" to say how much things are worth. At first money really was just chunks of gold, and a trader needed to have some way some of measuring the gold. The natural way was to weigh it. There are still, in our tables of weights and measures, the words "grains" and "barleycorns" from those long, long ago days when grains of wheat or barley were used as standards of weights (see page 161). The Persian table of weights for gold and silver has, as its smallest weight, a barleycorn, and three barleycorns equal one pea. A necessary tool of a trader of those days was a pair of scales with which to weigh the chunks of gold.

Early Coins

Gradually man came to use coins and to have the coins made by the nation. — Slowly, through agelong practices, man worked out a better plan. After chunks of gold came to serve as the language of trade, it was seen that this language could be more easily used if some way could be found for making sure how much gold was in each chunk. In other words, instead of using rough chunks or bars of metal, coins eventually came to be used. Coins were made in China more than 3000 years ago by making molds of sand and pouring in hot metal. A design was made in the sand, and this design then showed on the coin. All

peoples who have made progress in trading have had coins. They were used, for example, in Greece and Rome and in the Europe of the Middle Ages.

In time, man learned another lesson about the language of trade. Only a few hundred years ago, cities and states and lords and bishops all made their own coins for use in their own petty territories. It accordingly happened that a "franc" might have in it one amount of gold in one petty province; fifty miles away a coin of the same name might have more gold; seventy-five miles away it might have less gold; and so on. This caused much confusion and again made necessary the use of scales in trading.

Courtesy of Hayes and Moon: Modern History, (The Macmillan Company).

AN EARLY BANKER WITH HIS SCALES

The lesson was gradually learned that it was *wise to have only the nation issue coins,* so that the whole nation might have the same language of trade. We can see how wise that is by thinking of the United States to-day. It helps greatly in knitting our people of the forty-eight states together to speak the same language. What if we had forty-eight different languages! So also it helps in trading that we all use the same language of trade, the dollar. What if we had forty-eight different kinds of dollars!

We do not need to try to imagine the consequences. We have had actual experience. In colonial days, different colonies had different systems of money. It was so con-

fusing that when our national constitution was drawn up (ratified in 1789), a clause was inserted reading thus: "The congress [not the various states] shall have power to coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures; to provide for the punishment of counterfeiting the securities and current coin of the United States." In another place the constitution says: "No state shall coin money; emit bills of credit (make paper money); make anything but gold and silver coin a tender in payment of debts."

The national government has carried out these provisions. It has its own mints, or shops for making coins, and its own printing establishments for making paper money. Every coin that we use is made by the government so that everyone knows what to expect in it, and it is made by scientific methods and machinery in such a way that everyone feels safe in accepting it in trade, for he knows it is "good." The same thing is true of our paper money. The government does this work, paying for the work out of taxes, so that we may have a convenient language of trade. It has the same reason for doing this that our state governments have for maintaining schools or for maintaining good roads, — namely, to give us good means of communication.

What is in our language of trade. — In our ordinary language, we need short words and long words of different meanings. So also in our language of trade, money, we need several kinds. We need a kind and size, such as the cent, that will be convenient for small transactions. We need a kind and size, such as the $1000 bill, that will be convenient for big transactions. We need a kind and size, such as the smaller bills, that will suit transactions of medium importance. Man has slowly learned this and has slowly developed devices to meet these needs.

Token coins. — Since gold is exceedingly valuable, it is not entirely convenient for small transactions. Take our own money. The gold dollar is so small it is hard to handle. We ceased to coin it in 1890, and now we make gold coins in four sizes only: the \$2.50 piece, called the quarter eagle; the \$5.00 piece, called the half eagle; the \$10.00 piece, called the eagle; and the \$20.00 piece, called the double eagle. We make our smaller coins out of cheaper metals, such as silver and bronze and nickel, and call them "representative" or "token" money. They "represent" or "are a token of" the standard gold coin. The government makes only as many of these token coins as are needed in trade and always stands ready to redeem them in gold, if anyone wishes. This redemption makes them "as good as gold." Every trader knows they are perfectly safe.

Token paper. — So also, for very large transactions gold is not entirely convenient. The \$20.00 gold piece weighs something over an ounce. A payment of even \$100,000 (and that is not a large payment these days) would mean quite a load to carry around. To carry in coin the funds needed for a long journey would be a nuisance. Then, too, gold coins wear out in use, even if they do so very slowly. It is well to find something to represent them that is not so valuable and clumsy.

We have come to use paper money for this purpose, and it serves us very well. A \$1000 bill weighs no more and takes up no more space than does a \$1.00 bill. Paper is therefore, very convenient for large units of money. Of course, just as in the case of the token coins, the government stands ready to redeem its token paper money in gold, if anyone wishes. There must be no doubt that all the language of trade is good language — language that everyone will be willing to use.

Our government has handled our language of trade fairly wisely. Some mistakes have been made, but the work has been so well done that you and I do not need to know all the details about the different kinds of money we use. It is all safe, and "good as gold." A bird's-eye view of our monetary system shows that gold money is our standard, our unit of measurement. We have various kinds of "token" money, or "representative" money, for the sake of convenience. All our coins are issued by the national government. As for our paper money, part of it is issued directly by the national government, and part of it is issued by banks under very careful governmental supervision.

Our present great use of money is quite new. — On page 286 we said (1) money is really a very old device but (2) its great use has come about in the last few centuries. We have gone far enough in our study to see that the first statement is true: money, as a language of trade, is a very old device. Skins, cattle, sheep, and what not were used as money even before coins of metal were known, and there have been coins for thousands of years.

But the great use of money has come about in the last few centuries. That seems strange to us. We are so accustomed to selling our goods for money, buying almost everything we use with money, seeing wages paid in money, paying taxes in money, hearing of interest and rents being paid in money, thinking in terms of money, using money for almost everything between the cradle and the grave, that it seems as if all other peoples must have lived this way. The truth is that such wide use of money is quite recent. No earlier peoples have lived in any such way. Perhaps it will be easier for us to get our minds accustomed to this fact if we recall that the same thing is true in other parts of our living. For example, the beginning of scientific knowledge goes back

thousands of years. At times and at a few spots on the earth, there were a few scientists. But the great outburst of scientific knowledge, as shown by the chart on page 166, has been quite recent. So also with the use of money.

It becomes obvious that this is true when we remember that earlier peoples lived in a self-sufficing way and, therefore, had no great need of a language of trade. That was decidedly true of the Iroquois. It was largely true even of the "trading nations" and of the England of four hundred years ago. True, all of these and many other peoples made some use of money. But we have become a "market society." *Our whole scheme of living is planned and organized around the use of money.* Our story of man, the trader (see page 283), gave a hint that this would be true.

We plan, measure, and organize in terms of money. — *In the family.* — We see how true this is in our family life. Every family uses money every day in buying the things it uses. The home is purchased or rented. The clothing store, the grocer, the butcher, the baker, the druggist, and the physician supply a family with goods or services in return for money. Books, theater tickets, golf sticks, tennis balls, travel — all are possible to the family that has money to offer in exchange. So also, money measures what the family sells. The farmer's family sells mainly the farm produce it raises. The city family sells mainly the services of its grown-up members. In either case payment is made in money.

Gradually, families have learned that certain items have to be provided year after year, and that those items take about so much money. If they spend too much on one item, they must spend less on other items. Their income must be made to "go around." The wise housewife of to-day makes out a budget at the beginning of the year in which she estimates what she can wisely spend for food, rent, clothing, fuel

and light, medicine, insurance, savings, etc. As the months go by, she watches her expenditures and compares them with her budget estimates. If her bills for some items run too high, she must find a way of cutting those expenses or of spending less for other items. She works all this out in dollars and cents — in money. Money thus becomes a device for planning and measuring and organizing the life of that family.

In business. — So also, money is a device for planning and measuring and organizing the work of every business man. Many business houses make up budgets for their businesses in which they estimate the income from each class of work, the expenses, and the gains. Then they watch their actual operations, month after month, and take such action as seems wise.

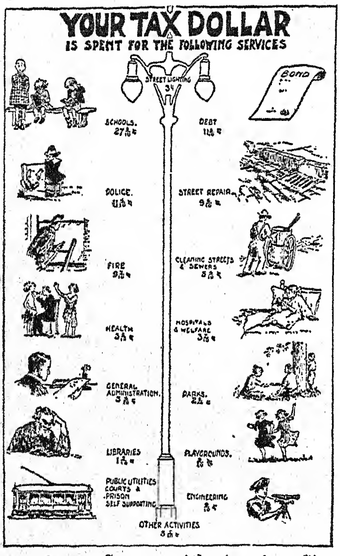
A POSSIBLE BUDGET
FOR A FAMILY OF FIVE
WITH A $2,000 ANNUAL INCOME

Items	% of Income
Food supplies	30%
Clothing supplies and repairs	16%
House and house operation (rent, insurance, repairs, taxes, housekeeping supplies, and labor)	33%
Health, education, recreation	11%
Savings	10%
Total	100%

Even a business that does not make out a budget plans everything in terms of money. The factory owner decides whether to buy one machine at $300.00 or another at $325.00; whether to buy a machine or to hire more workers; whether to expend $500.00 for advertising in a paper or $300.00 for advertising on billboards; whether to sell all his product at $5.00 per unit or to make two brands, selling one at $3.50 and the other at $6.75. The farmer decides whether to buy cattle and feed them his hay or to sell the hay in the market; whether to buy a tractor or horses for plowing. So it goes, everywhere. All businesses are planned and organized on the basis of dollars and cents.

In government. — So also, money is a device for planning and measuring and organizing much of the work of our city,

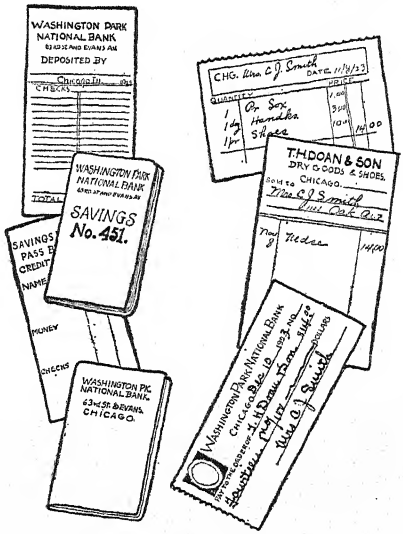
state, and national governments. Our servants, the public officials, plan the things that should be done and what it will cost to do them. In this will be included costs of army, navy, education, maintaining parks, paying policemen and firemen, keeping up playgrounds — hundreds of things. They figure out what taxes should be laid and what they will yield. There are taxes on incomes, on real estate, on inheritance, on personal property, on corporations, as well as many kinds of fees and special assessments. The public officials think through all their plans and finally organize a budget of governmental income and expenditures just as did the family and the businesses discussed above.



Courtesy of the American City.

Very many institutions and devices are connected with our use of money. — Since this language of trade is so important in our life to-day, it is natural that there should be many devices and institutions connected with it. We have already talked of mints and budgets. We might well talk of savings banks, commercial banks, postal savings banks, trust companies, investment banks, Wall Street, the stock exchange, the money market, checks, promissory notes, bills of exchange, bonds, trade acceptances, and a host of others. A glance at the financial pages of any newspaper will show a perfect maze of financial institutions, financial terms, and financial devices. These affect our

living in such important ways that we have come to speak of "the financial organization of society," or "the pecuniary (that means monetary) basis of society." These are large words used in our scientific writings to say what we have been saying in this chapter: money has become so important that our lives are planned or organized around its use. Our "market society" is also a "money society." This has come to be true only in the last few hundred years.



Some Business and Banking Forms

Our society is now a credit society. — A writer once said, "We use money so much that we hardly use it at all." That was his way of saying this "money society" of ours has become able to use "credit" to do the work of money.

When a housewife has a tradesman "charge" her purchases until the end of the month, she "buys on credit." If she pays her bill at the end of the month by a check drawn on a bank, as most housewives do, she uses "credit" and not real money. Suppose the tradesman keeps his funds in this same bank. He "deposits" the check. The bank subtracts that amount from the housewife's account and adds it to the tradesman's account. No actual money was used, yet business was transacted. To-day most buying and selling is "on credit" rather than for cash, and most payments are made

by check. Probably ninety-five per cent of our wholesale business and eighty-five per cent of our retail business is thus conducted. So also, if I borrow money, I give a "promissory note" (promising to repay). The lender usually hands me a check and not actual money. When I repay, I hand him a check. When business houses borrow, as they do in enormous quantities, the matter is handled the same way, although the paper documents used sound more impressive.

Odd as it sounds, the writer was entirely correct. We use money so much we hardly use it at all. We make much more use of checks, drafts, promissory notes, bills of exchange, etc., than we do of actual money. This does not mean that money has ceased to be important. Quite the contrary; it has become more important, for all this credit work is carried on in terms of money.

It is very important to have good money. — Since our whole way of living is organized around the use of money, it is highly important that our money should be good money. Particularly, it ought not to change in value rapidly.

Suppose we lived in some topsy-turvy world where we did all our measuring of length by yardsticks that had a magic trick of growing much longer or much shorter as they chose. How could one plan buildings, or roads or ditches or anything else requiring length measurements in such a crazy world? It would be so confusing that progress would be greatly checked, would it not? But suppose we lived in some world where all dollars (which measure values) had a magic trick of suddenly changing in value. Would it not be a very difficult world in which to carry on family planning and business and public work? Would not our ways of living be very much disturbed? Would not progress be checked?

Now this thing that we supposed is not so absurd as it sounded. Gold changes in value. Since the dollar is, after all, only a chunk of gold, "the dollar" changes in value (prices rise or fall) along with the gold. Fortunately, gold does not usually change in value with great speed, so that it serves us fairly well. But it serves us only fairly well, and one of the problems of the day is that of working out a system of money that will be "stable." That means one that will not fluctuate in value.

DOLLAR LAST WEEK WORTH 66.7 CENTS UPON 1913 BASIS

In terms of wholesale prices of 200 representative commodities, the purchasing power of a dollar last week averaged 66.7, compared with what it would have bought in 1913 In the following table the index number shows prevailing prices compared with those of 1913 and the purchasing power represents what $1 would buy in the period covered comparable with 1913:

	Index number.	Purchasing power
1913	100	100
1920 May [peak of prices]	247	40.5
1922 January [low]	138	72.3
1923 January average	157	63.7
1923 February average	166	61.7
1923 March average	166	60.2
1923 April average	167	59.9
1923 May average	163	61.5
1923 June average	158	63.3
1923 July average	158	63.2
1923 August average	154	65.0
1923 September average	155	64.4
1923 October average	155	64.3
1923 November average	152	65.8
Week ending Dec. 1	151	66.4
Week ending Dec. 8	151	66.2

Sometimes nations get into unfortunate situations where they cease to pay gold for paper money as they have promised. They cease to redeem their paper money in gold. When this happens, they sometimes print enormous quantities of paper money, which then changes in value very rapidly. This happened, for example, in Russia and in Germany after the World War. Before the war, our dollar was worth four marks. October 1, 1923, it took 3,800,000,000 paper marks to equal one dollar. A month later it took 167,000,000,000. After another month it took 7,000,000,000,000. The results in Germany were very serious. Business became more like gambling than like ordinary business. No one felt safe in making plans with the value of the mark changing so rapidly.

BERLIN, Nov. 20.—(By mail by the Associated Press.)—Before the war the wealth of the entire world was estimated at about three trillion gold marks. That number of marks, at the rate of early November, was worth only about $2.

A box of matches today costs more paper marks than there were gold marks in the greatest fortune in Germany before the war.

The fortunes of Bertha Krupp, the Prince of Henckel-Donersmarck and the Duke of Oldenburg were variously estimated at from 1 to 300 million gold marks, but the beggar would scarcely accept that number of paper marks today.

We cannot stop to try to understand the whole science of money. It is a difficult subject, one that demands careful and hard study. There are, however, certain matters that should be clear to anyone.

1. Money is a very useful device. It multiplies man's powers by serving as a language of trade.

2. We have come to plan and organize all our ways of living around the use of money.

3. This makes money so important to us that we are anxious to have our money good money. The nation that blunders in handling its money harms its people. One of the most common blunders of the past has been that of printing enormous quantities of paper money that could not be redeemed in good money.

4. In the matter of good money, as in so many other aspects of our living, it is well to turn to our scientists for counsel and advice. It is too important a matter for "tinkerers" to handle.

Problems

1. Define or explain, using the dictionary if necessary:

coinage	barter
trade	budget
a self-sufficing group	money
astrolabe	dollar
internal trade	token money

2. "Trade enables us to get goods we could not otherwise have." Give several illustrations not found in the text.

3. "Trade enables us to get goods more cheaply than we could otherwise get them." Give several illustrations not found in the text.

4. "Trade enables us to lead a more diversified life." Prove this.

5. "Trade multiplies man's powers to live well." How?

6. "Trade and commerce did not play as large a part in the living of the early trading nations as they do in our living to-day." Show that this is true.

7. What were the reasons for the meager trade and commerce of four hundred years ago? Do those reasons still exist?

8. How do you account for the fact that there has been such a great expansion in trade in the last one hundred years?

9. "We are a market society instead of a self-sufficing society." What does this mean?

10. "Man's way of living has been revolutionized by trade." Show that this is true.

11. "To-day everybody is a trader." Explain. How does that differ from the situation in the early trading nations?

12. Give examples of barter in modern life. Do you ever "swap" things? Even when you do, do you sometimes figure out what the things swapped are worth in money?

13. Tell why skins, while better than nothing, are a poor form of money. How would baskets of vegetables do as money? What are the good points of gold for this purpose?

14. Why did a colonial family have little use for money? Does a farmer to-day use money as much as a merchant in a city? Does a farmer to-day use it as much as the colonial farmer did?

15. In the Middle Ages one could travel hardly fifty miles without needing to have his money changed. Why? Why are money changers not necessary as we pass from one state to another in our country?

16. Some of the designs on money are intended to remind us of something in the nation's history. Find some such designs on our money.

17. The government stands ready to redeem a worn coin with a new one. Does this not cost the government something? Does this cost not come out of taxes? Why do we redeem these worn coins? Do *we* do it when the government does it?

18. From time to time, the government redeems and destroys worn-out paper money and prints new bills instead. Does this not cost something? Why does the government do this?

19. What is counterfeiting? Why do we have laws providing for the punishment of counterfeiters? Do counterfeiters harm society?

20. "Money has become a device for planning and measuring and organizing many of the activities of the family." Explain.

21. "Money has become a device for planning and measuring and organizing most of the activities of business." Explain.

22. "Money helps us decide what we want to work at, what we want to buy, what we want to do." Show that this is true.

23. "The owner of money can command. He can get workers to work for him, landowners to let him have land, and owners of capital goods to let him use them." Is this true?

24. "We are a credit society." What does this mean?

25. "The government does not make the value of gold or of the dollar. All it does is to call 25.8 grains of gold, nine-tenths fine, a dollar. This does not say what the dollar is worth or will buy, any more than the law that sixty pounds of wheat make a bushel says what the wheat is worth." Do you agree?

26. Answer the questions at the beginning of the chapter, page 273.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter IX.

1. Early Fairs and Markets (the main trading places of the days of small trade).
2. Coins (the origin of coins; how our coins are made and are kept in good condition).
3. Paper Money (how our paper money is made and kept in good condition).
4. The Commercial Bank (how it came into existence; what it does).

See also:

Chapter XII, 3. Linking Country and City (the marketing of wheat as an illustration of linking country and city).

Chapter XII, 4. Modern Storage (one of the specialized tasks in the marketing work of society).

Chapter XVI, 1. Improving Our Market Machinery (one example of how we improve the knitting together of our specialists).

Problems to think over are given in these reading selections.

CHAPTER X

PASSING ON THE TORCH

A. What It Means to Pass on the Torch
B. The Family, the Great Torchbearer
C. The School's Coöperation in Torchbearing
D. The Church and Other Coöperators in Torchbearing

Questions to Keep in Mind while Reading This Chapter

1. Why is it important for each new generation to get the stored-up knowledge of the past?
2. What are the main agencies that transmit this stored-up knowledge?

We have carried our story of man, the communicator, far enough to see that he has, through the long years, greatly multiplied his powers of communication. Beginning with his ability to talk, he has become able to write, to print, and to scurry around over the earth in steamships, railroads, automobiles, and airplanes. He has annihilated distance with the telegraph, the telephone, and the wireless. The whole world has become a great "whispering gallery" for his messages. Through trade, all lands coöperate in gratifying his wants. Money is the language of trade.

Just as man has devices to reach out to all the world of to-day, so also he has devices for communicating with the generations yet to be born; he has ways of passing on his torch of knowledge to coming generations. Let us notice how important it is that this torch should be passed on. Then let us study some of the institutions (such as the family, the school, the church, and the press) that have become our great torchbearers.

A. What It Means to Pass on the Torch

(How much we learn from others; when we learn most easily; why man is the best learner.)

Accounts of feral men show that much is passed on to us by the group we live in.—About one hundred years ago, over in central Europe, a baby boy was one day left on the doorstep of a peasant's hut. The peasant took the baby in, but for some strange reason he took care of him in a very queer way. The boy was kept day and night in a dark underground cell, where he did not see daylight or trees or animals or anything else of the outside world. He never heard anyone talk. He did not even have playthings, except two wooden horses. He never saw anyone. Even the peasant who took care of him came only when the boy was asleep.

When the boy was set free, after fourteen years of such life, he acted in a most unusual way. For example, he seemed to have no clear idea how far away things were; he reached for distant things, just as babies reach for the moon. The first time he saw a candle, he put his hand in the flame and was burned. He seemed to think anything that moved was alive, even to bits of paper or dry leaves blowing about. As for what we call manners or social customs, he had none. He understood nothing that was said to him and had no speech of his own. His senses of hearing and touch were quite strong, but it was difficult for him to walk.

We know of other cases of boys and girls who from their earliest days did not come into contact with other persons. We call them "feral" people, meaning that they have grown up alone or with animals rather than with other persons.

We learn most things from other persons. — As we read of such persons, we begin to realize how many things we learn from others. We find very few things out for ourselves; we

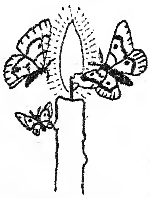
learn most things from others. We learn, for example, how to talk and write; how to make a fire, use tools, and build houses; how to eat and dress; how to begin and end a letter. We also learn what to believe about the past, about ourselves, and about the world we live in. This covers everything from the origin of the earth and man to why the wind blows, why water freezes, why we fought the Civil War, and who God is.

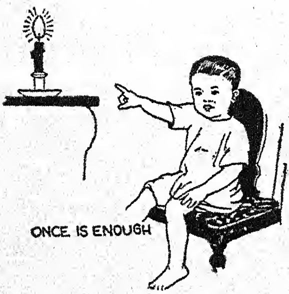
The early, plastic years. — The accounts of feral persons also show that even after they were found, it was very hard for them to learn the ways of the people who found them. They had trouble in learning to talk and in learning ordinary things about food, clothing, tools, etc. In other words, unless one learns the ways of his group early in life, it is hard ever to learn them. Our early years are our most plastic years. Plastic means easily shaped or molded. By the time we are three years old much has been done to "shape" our dispositions, our notions, and our habits. By the time we are fifteen or twenty-five we have largely been "set" in the ways we shall think and act through life.

Why is it necessary to pass the torch on? — How does it happen that we need to have the stored-up knowledge of the group communicated to us? If young robins were kept away from other robins from the day they were hatched, they would still know how to make nests when they grew up and would in all other ways be quite competent robins. Beavers that had lived alone from babyhood would know how to make their houses and dams. Ants and bees that had thus been raised and later "found" by their groups could at once fit in with the group life. Speaking in general terms, the insects are free from any need of being educated. While the higher animals are not entirely free from this need, they are fairly free from it. Man alone, of all animal life, loses a very

great deal when cut off from communication with his own kind. He needs to be educated. Why is this true?

And here is another interesting question. How does it happen that, of all forms of life, man is the best learner? Dogs and cats and beavers and horses and other animals can be taught a few "tricks," but just think how little they can learn compared with man. They are not nearly so plastic. They are more unchanging and rigid. Why is this?





Creatures having only instincts cannot learn. — Some of our scientists give a very interesting answer to the questions of the preceding paragraphs. Far, far back, they say, as the lower forms of life were slowly developing, a very interesting split, or fork, took place in that development. One branch was the road taken by the insects, such as the bees, the moths, and the ants. Those who traveled this road are almost entirely creatures of instinct. They have their whole equipment for life when they are born, and they are able to learn little or nothing. They are not plastic; they are rigid.

Take the moth, for example. The moment a moth emerges from its pupa stage, it has all of the abilities of a grown moth. It does not have to be told where and how to get its food; where and how to get shelter; where and how to lay its eggs and provide for its young. It does all things by instinct. It can become a thoroughly capable moth without ever seeing or learning from any other moth. But there is another

side to the story. While it is "born" with all the abilities of a grown moth, it is rigid. It cannot learn. For example, when it sees a candle flame, it flies into that flame. It gets scorched, and flies out. But it does not learn to avoid the flame. If it sees the flame again, in it goes, and that continues until either the flame is taken away or the moth is killed. It cannot learn. It has almost no ability to change.[1]


FIRST STEPS
FROM PAINTING BY C. BRACK

Man has instincts plus ability to change and to learn. — The other fork of the road was taken by those forms of life that were to develop into the mammals, such as the cat, the dog, the horse, and man himself. Those who took this path also have instincts; but they have, in addition, an ability to change. They are not rigid. They can learn. Of all who traveled this road, man is the most plastic. No other form of life has anything like his learning power.

Furthermore, the plastic period lasts longer with man than with any other animal. He starts, indeed, with so little "set" that he is helpless. "As helpless as a baby" has become one of our common sayings. The moment the moth appears, it is able to take care of itself. The young faun can run almost from the time of its birth. The period of helplessness for such animals as the cat and the dog is a short one. How very different it is with man! A year is likely to go by

[1] Adapted from Bagley, *The Educative Process*. (The Macmillan Company.)

before a baby is even able to walk. Another year may go by before he has learned to talk. It will be several more years before he has learned how to secure his own food, provide his shelter, and protect himself from danger. Many more years will go by before he has learned all he needs to know if he is to live well in this complex world of ours. This is the main reason why, in the eyes of our law, a person remains a minor until twenty-one years of age. During that whole period, says our law, this minor should remain in the care of his parents or other mature persons. He needs that long a period to prepare to be a full-fledged member of the group.

Every group has torchbearers. — It is now clear how important it is that we should have devices for passing on to the on-coming generations the stored-up knowledge of the race. If we were unable to do this, the race would be only a short time in returning to the wretched conditions of Neanderthal man, for we *learn* most of the things that make life worth while. Since we do have devices for passing on to the new generations all that the earlier generations have learned, each new generation has a chance to begin its climb of progress at the point reached by the preceding generation. "We stand on the shoulders of all the generations that have gone on before us."

Every group or society has ways of passing on to its younger members its stored-up knowledge. Take the Iroquois. There was the story-teller whose stories of the customs and brave deeds and religion of the people were eagerly heard by young and old alike. In the winter nights of the long houses, the talk among the elders was picked up by the children. The councils were great places for the youngsters to learn the ways of the tribe. At the gens and village councils where local affairs were talked over and at the tribe and league councils where the laws and customs of the whole people were recited,

the boys and girls would drink in every word. At the festivals and dances they would learn of the "spirits." In their plays and games they would imitate the deeds of their elders.

Although there were no schools, there was a certain amount of teaching. The father would show the boys how to make the canoe, the bows and arrows, and the other weapons of war and the chase. The mother would show the girls how to till the soil, prepare the food, and take care of the long house. In such ways, the Iroquois lads and lassies learned how to play their part in the savage life of the time. They learned to do the ordinary work of the tribe. Let us call that learning the industrial arts. They also learned the history, customs, religion, and ideals of the tribe. They were thus prepared to live in their group or society.

INDIANS IN COUNCIL

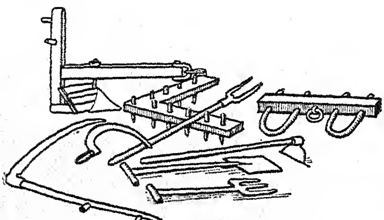
Our life to-day is more complex than that of the Iroquois. There are many more things to be learned. It is natural, therefore, that we should have not only their ways of passing on the torch, but also many others. We still use the family, and story-telling, and play, and talks by elders. In addition we have schools and churches and books and theaters and many other devices. Let us look first at the family, the great torchbearer of the race.

B. The Family, the Great Torchbearer

(The great transmitter of language, attitudes, opinions, customs, practical arts, and ideals.)

The colonial family taught the industrial arts to the younger generation. — We can best see what the family can do as

a torchbearer if we look at its work in a society where much of the life centered about the family. Let us choose for study the farm family of our colonial days. We know that in our colonial days the roads were few and poor. There were no railroads, and many families were located where there were no waterways. The result was that the farmer and his family lived very much to themselves. What the children learned they learned mainly from the family. For example, since the colonial family raised or made nearly all the goods they used, the children learned the industrial arts right in the home.[1]



HOMEMADE COLONIAL TOOLS

Making farm tools. — Their farm tools (of which the modern city boy or girl scarcely knows the names) are a fair example of the things they made. These consisted of log boats and sleds for transportation, plows, harrows, pitchforks, hand rakes, shovels, ax handles, hoe handles, scythe snaths, singletrees, doubletrees, clips, clevises, ox yolks, and harness for the horse. All manner of makeshifts were necessary to supply some of these articles. For example, horse collars were made of corn husks; hames, of crooked roots; clips and clevises, of hickory withes; ox yolks, of bent hickory wood; traces and bridles, of twisted deerhide; and pitchforks, from forked boughs or antler horns.

Providing lights. — The colonial family had to provide itself with lights for the evenings. Kerosene, gas, and electricity were unknown, so less satisfactory means had to be used. One such means was candlewood, which was nothing

[1] The colonial-family material comes from *Lessons in Community and National Life* B-2 and C-2. The original phraseology is followed as largely as possible.

more than the knots and hearts of resinous pine trees. Then, too, rushes were used, after being dipped in tallow or grease. Oils from fish, bear, whale, and moose all did good service. Most important of all, however, were the candles made from the tallow of bayberries, and candles from animal tallow, whale oil, and honeycomb wax.

Making clothing.—The hides of animals killed for food on the farm or the skins of the deer, squirrels, raccoons, rabbits, beavers, and foxes shot or trapped in the woods were used for many purposes. Deerskins were made into hunting shirts, breeches, coats, leggings, and moccasins. Gloves and mittens were made from the skins of squirrels and beavers. Caps were made from the skins of raccoons, bears, foxes, cats, rabbits, and woodchucks. Bearskins were made into beds and bedding.

A FRONTIERSMAN

While the farmer and his boys were busy supplying leather clothing, the wife and daughter were manufacturing cloth for making other wearing apparel of the family. They raised flax in their own little patch, harvested it, separated the cloth-making fibers from the woody part of the stock, and prepared the fibers so that they could be spun into thread. Then they wove the cloth. After the cloth was finished, they bleached it or dyed it. There remained the task of shaping it into garments.

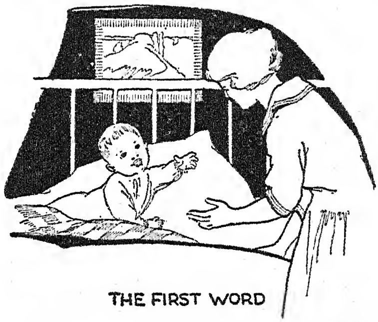
The colonial family also taught ideas and ideals. — It is clear enough that the colonial family passed on to the younger generation most of the industrial arts of the time. But that was only a beginning of its work as a torchbearer. Schools were few, and often the hard-working mother taught the children to read and write. Around the fireside in the long winter evenings, the family would gather while an older member of the group read from the slender stock of books or from an occasional newspaper. Then too, from the family talk and actions the youngsters got most of their ideas of government, of loyalty, of right and wrong, and of religion.

The family is still our greatest torchbearer. — The colonial family was a small picture or miniature of the whole society of that time. One could, accordingly, learn in the colonial family almost all the important matters connected with living together in society.

To-day the family is not such a good miniature of the whole society. For example, many of the industrial arts are carried on to-day in large factories rather than in the home, so that the home is no longer the only place where the industrial arts are learned. Nevertheless, the family is still our most important device or institution for passing on to the young the stored-up experiences of the race. It is, indeed, almost the only such institution during the earliest and most plastic years. In the later years of the child's life, the family shares its torchbearing work with the school, the church, the club, and the playground. But even in these later years children continue to learn by imitating the elders in the family, by being taught all sorts of things by the parents, and by taking part in the duties and joys of the family life.

A list of the more important deeds of the family as a torchbearer will show how much we depend upon it.

1. *The family gives us our spoken language.* — By this time we know how important language is if we are to live together well. But did you ever ask yourself how you got the language you are using? You got it in the family. Your mother and father and elder brothers and sisters hung over your cradle and coaxed you to imitate their gestures, their sounds, and finally their words. Your first word was a great event in the family. After that, few waking hours went by that they did not encourage you to talk and talk and talk. So thoroughly, indeed, did they do their work during your plastic years that they largely "set" your habits of speech for life. You can change these habits later, but it is not easy to do so. The family, then, has given you the greatest tool you will ever use — speech.



THE FIRST WORD

2. *The family largely "sets" the way our muscles and nerves are to act all the rest of our lives.* — During our early years we are a "clean slate" upon which the family writes without knowing it. The reason is that we imitate the grown-ups. "He walks just like his father," "That gesture of hers is exactly like the one her mother makes," and a host of other sayings show how much the family affects our bodily actions. So also it affects our dispositions. Whether we are "spoiled" or "good as gold" or "stubborn" or "sunny" will largely be the results of the physical care we are given; of what we find to imitate; and of what is required of us during those early very plastic years.

3. *The family teaches us many of the industrial arts.* — It is true that the family to-day teaches the industrial arts far

less than did the colonial family, but it still teaches them. Most girls still learn to sweep, sew, and run the house by learning from the mother. The country boy still learns many industrial arts from his family. Even the city boy is likely to have his shoproom where he and the other members of the family work on his special interests and "fads." There is no doubt, however, that schools and business houses have taken over much of the task of passing on to the younger generation the useful industrial arts.

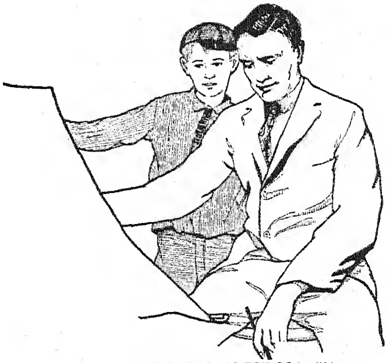
AN EARLY LESSON

4. *The family largely "sets" us in our ways of thinking, our tastes, our manners, our opinions and ideas.* — This is just what we should expect. No one can know enough or have time enough to work out all these matters for himself. Accordingly, in our plastic years we pick them up from the adults in the family. If the parents or older children love art or books or music, the youngsters will ordinarily love them also; if the older members love amusement and sports, so also will the younger ones. If the father is a Baptist, a Republican, a Mason, or a member of a trade-union, the chances are the boy will be these also.

Of course, children do not always follow exactly in the footsteps of their elders, especially in these days when so

many other forms of communication beat upon them (see page 211). However, there are few sayings more common than these: "She is her mother's own child," "He is a chip off the old block," "Like father, like son." They show how true it is that the family shapes us.

5. *So also, the family largely "sets" us in our ideals and aspirations.* — The teachings and examples of our elders, as well as the talk of the congenial family gathering, develop our ideals. In the family, more than in any other single place, we learn to love, to wish to be of service to others, to be loyal to home and country, to know the difference between right and wrong, and to follow the teachings of religion. It has often been pointed out that high-mindedness runs a good deal "in families"; so also does low-mindedness. For better, and sometimes for worse, the family shapes us.



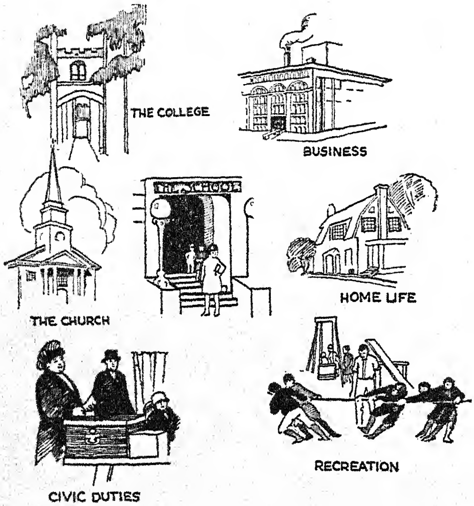
FATHER'S LATEST DRAWING

C. The School's Coöperation in Torchbearing

(What the school does; the arrangement of its work; the American school system.)

We have come to see that we need the school. — The family is our greatest torchbearer, but we have found that it is wise to use other devices also. This is partly because our life is so complex that the family is no longer a miniature of the whole society. It is partly because our knowledge today, as shown by the list of sciences on page 157, is so large that the older members of the family cannot possibly get

time to learn it and pass it on to the children. Such work requires specialists who give all their time and thought to the task. Those specialists are the teachers in our schools. They study the enormous mass of knowledge of to-day and pick out the really important parts that we must all be sure to get if we are to live together well. Then they work out effective ways of passing these important parts on to us. Their work is done in schools where there are libraries, laboratories, workshops, playgrounds, and other helpful devices.



THE SCHOOL COÖPERATES WITH OTHER INSTITUTIONS

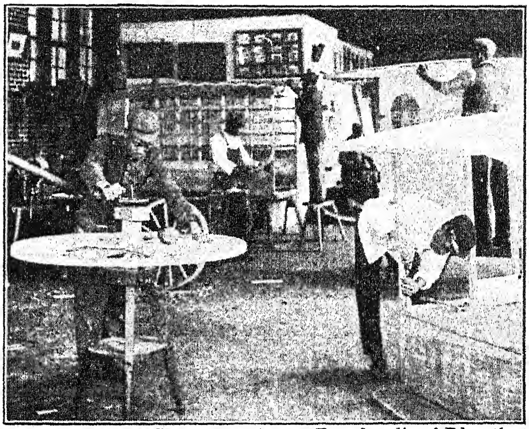
Our schools are the center of society's effort to pass on the stored-up knowledge of the race.

Our schools teach us the great factors in human progress. — It is easy to say that our schools help us to live well in society — help us to play our part in human progress; but just what does that mean? What do we expect to find taught in our schools? Since this book is a story of human progress, its Table of Contents will point out to us the vital and important parts of our race experiences. It will point out the things we must understand if we are to live together well. Let us turn back to the Table of Contents.

Part I is merely introductory. It shows us how man once lived, so that we may have something against which to

measure his later progress. Parts II, III, IV, and V take up, one after another, the four great aspects of human progress. These parts deal with Man, the Harnesser of Nature; Man, the Communicator; Man, the Social Organizer; and Man, the Idealist and Aspirer.

Science the great harnesser of nature. — Part II shows that man must be a harnesser of nature if he is to live well, and it points out that science is the greatest of all harnessers. Since this is true, there should be somewhere in the course of study in our schools, work in the sciences. So also, there should be courses applying the sciences to our ordinary vocations, to our industrial arts, to the task of making a living. Is that the case in the schools of your city? Are such sciences as geography, physics, mathematics, and chemistry studied? Are there vocational courses (courses preparing one to make a living) in shop work, domestic science, etc? Is anything done to let you know about the various vocations that exist to-day and how to prepare for them? Do you see how sensible such courses are?



Courtesy of Monroe: Encyclopedia of Education.

A CLASS IN WAGON MAKING

Communication. — Part III shows that communication is essential to living together well. It follows that we should

have in our schools work in language and the language arts, and that we should have a chance to learn of the forms and means of communication. Do the schools of your city teach English? Do they teach foreign languages? Is writing taught? Is reading? Is typewriting? Are numbers taught, so that they can be used in communication? Do you see how sensible such courses are?

Social organization. — Part IV deals with man, the team-worker, the coöperator, the member of an organized society. Evidently, when we study Part IV, we are to see that man finds still another multiplier of his powers through coöperating with others in a group or society. That being true, we should expect our schools to give us the social studies (history, civics, economics, and sociology) so that we can learn how society is put together and how its work is done. We should expect to find our schools telling of our country, of what it means to be a good citizen, of some of the problems our country faces, of what we are doing about those problems, of the joy and worth-whileness of serving society. Do you find such things being done in your schools? Are any social studies taught? Do you hear of our national heroes? Are patriotic exercises held? Do you learn of the duties of the officials of the city government and how to help them? Do you see how sensible such work is?

Ideals and Aspirations. — Part V presents man, the idealist and aspirer. Already we have begun to see that right motives and ideals are absolutely necessary to living together well. We may expect, then, to see our schools dealing with ideals and aspirations. Our schools do this in the social studies and also in art and music where man has so frequently tried to express his aspirations. We have thought it best not to have religion taught in our public schools, but in many other ways those schools deal with right motives, truthful-

ness, honesty, service — with ideals and aspirations. Do you see how sensible this is?

Then, too, the schools, as we know, concern themselves a great deal with health and recreation. No argument is necessary to persuade everyone how helpful it is to have sound bodies and happy minds in doing the world's work. Wholesome play, furthermore, is one of our best torchbearers, as we shall see later (page 324).

Schools are not a very old device. — The school is a young institution, as compared with our oldest social institution, the family. The family is old, older than the city or state — older even, than tools or clothing. But the school is new. Neolithic man, for example, did not have it, although he almost had it when the story-teller told the children the myths and customs and history of the tribe. In some societies, after man learned to write, schools were set up in which the priests or other wise men taught from their writings and especially from some sacred book. The ancient Egyptians, the Babylonians, the Hebrews, the Chinese, and the Hindus all taught selected members of the group in this way.

The Greeks (later the Romans copied the Greeks) had better schools, though their schools also were open only to the favored few. School life for the Athenian boy began at about the age of seven. He was placed in the hands of a private tutor, who daily led him through the streets of the city to add to his instruction in reading, writing, music, and gymnastic drill. At fifteen or sixteen, the boy was placed in a public school. Here he talked with his elders and learned Greek laws and customs. After two years of this he had two years of training in the use of arms. It is quite clear that the Greeks were anxious to pass on to the young healthy bodies, active minds, training as citizens, and love of the beautiful.

After the collapse of Rome in the fifth and sixth centuries, there were few good schools in Europe. They were not needed to pass on the simple living of the barbarians. Presently, however, schools arose again in the Christian monasteries, growing fairly rapidly after the Rebirth of Learning that helps mark the beginning of our modern life. But they were still for the favored few. Education for everybody is a recent matter. It is not one hundred years old in even our own country.

A Greek School
(Copied from an old vase.)

The present American school system is quite new. — In case after case we have seen that the last one hundred years have witnessed great strides in man's progress. That is true of fire, metals, power, machines, science, printing, and transportation. It is also true of our schools. It is only within the last hundred years that we have really come to understand that we are living in a new world, and that the education of children is the hope of the future. Only during the last few generations have we seen how important it is to make much use of schools in giving this education. Only during the last few generations have we taken these great steps to make our educational system what it is:

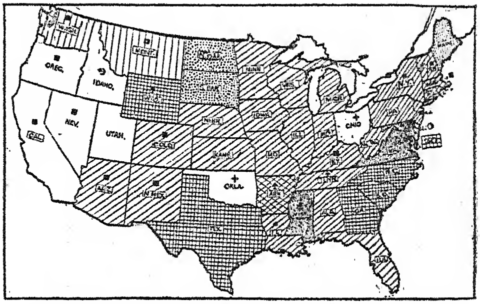
1. *Free schools.* — We have made the public schools free. That is, they are maintained by public taxes and not by fees paid by the parents. They are free to all, rich and poor alike.

2. *Compulsory attendance.* — We require all children within certain age limits (the limits varying in different states) to attend school. These compulsory schools are our elementary (and sometimes our secondary or "high")

schools. We try to make sure that everyone shall have a chance to learn the stored-up wisdom of the race.

3. *Higher education.* — We have extended free education up into our high schools, thus showing our belief that modern complex life needs a longer period of school training. Furthermore, many states and quite a number of cities have set up colleges and universities, open to all at very low tuition rates. Sometimes no tuition at all is charged.

4. *Governmental supervision and aid.* — We have provided state systems of education, so that no locality may fail to provide satisfactory schools. These state systems vary somewhat from state to state. In general, however, our elementary and high schools are *managed* by the locality (the county, city, township or district) in the sense that local boards of education hire the officials and teachers and govern the schools. These schools are *supervised* by the state in the sense that the state passes general laws concerning courses of study, the powers of the local boards, etc. There is likely to be, too, a state superintendent in charge of supervision. These schools are *aided* by the National Government which has given over 150,000,000 acres of land to the states for educational purposes. Then, too, it has given millions of dollars to aid industrial, commercial, and agricultural education. The Federal Bureau of Education studies educational problems and aids states and localities with its advice.



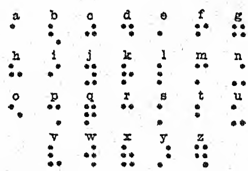
Compulsory School Attendance in 1922

The states in white required school attendance to the age of 18. The heavier the shading, the lower the standard.

5. *Private schools.* — In addition to the public schools there is a host of private schools, ranging from the kindergarten up through the elementary school, the high school, the college, the professional school (see page 157 for the story of our schools of technology), and the university. Then, too, there are both public and private schools for our unfortunates, the blind and the deaf. There are public and private schools for those who have to drop out and go to work before their education has been carried very far. These public schools are "continuation schools" in which one can continue his schooling while at work. The private schools are such institutions as the private "business college" for teaching clerical work, and the "corporation schools" of our large business firms for the training of their employees.

TEACHING THE BLIND GEOGRAPHY

There is no doubt that we, as a people, are fully persuaded it is a good thing to use schools as one device for passing on the stored-up knowledge of the race. We rely upon them to train our leaders, knit our people together, give us good methods of work, show us how to keep in health, help us make good use of our leisure time, help us appreciate the finer things of life, and prepare us to live together well in a democracy. We are such believers in education that some writers say education has become a part of our religion. Of course, these writers mean by such a statement that we have come to think of education as one of the most important devices a people can use in its effort to live together well.



ALPHABET FOR THE BLIND

Instead of the dots the paper is raised or embossed at those points.

SOME PROOFS OF OUR BELIEF IN EDUCATION

50,000	teachers in colleges and technical schools	24,000,000	persons attend school every year
137,000	teachers in public high schools	2,500,000	persons attend high schools
22,000	teachers in private high schools and business colleges	620,000	persons attend colleges and universities
12,000	teachers in private and public kindergartens	$350,000,000	spent annually on colleges and universities
706,000	teachers in elementary and secondary schools	$450,000,000	spent annually on high schools
		$1,200,000,000	spent annually on elementary schools

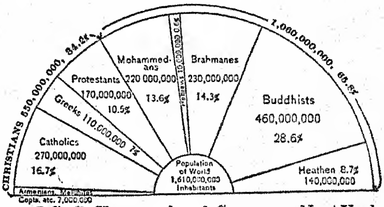
BUT NOTICE THAT WE SPEND

$6,000,000,000 annually on movies, candy, and smoking

D. The Church and Other Coöperators in Torchbearing

(Religions and churches; young peoples' groups; newspapers, books, and libraries.)

There have been hundreds of different kinds of religions in the past. There still are many kinds; but as time has gone on, four religions have been accepted by such a large proportion of the world's people, that they are called the four great religions. They are (1) Hinduism and Brahmanism, whose followers are mainly in India; (2) Buddhism, whose followers are mainly in Japan, China, Burma, and Ceylon, (3) Mohammedanism, whose followers are mainly in Asia and Africa; and (4) Christianity, with followers mainly in Europe, America, and Australia, although they are scattered all over the world.



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The World's Main Religions

Everyone is born into some religion. — There has never been a people without a religion. It may have been a strange religion, as we think of such matters; but there it was and is, always. Furthermore, it has always been very influential in the lives of the people. A group usually feels that its religion is about its most important possession. It uses its torchbearers, therefore, to pass the group religion on to the later generations. In earlier days, this was done by the family, by the story-teller, by the medicine men, and by the priests. To-day, it is done mainly by the family and the church, although other torchbearers also help.

SITTING ON A BED OF SPIKES

This fellow thinks he is pleasing his God by this act.

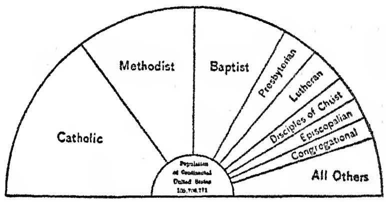
Since Christianity is the chief religion of our country, let us look at the work of the Christian church as a torchbearer.

The Christian religion emphasizes right conduct toward others. — The most important thing we need to keep in mind when we think of the Christian church as a torchbearer is this: the Christian religion holds that its teachings should be effective in our everyday life; and that they should affect the way man acts toward man just as truly as they should affect the way man acts toward God. That is rather a novel idea, as religions go. Most earlier religions concerned themselves only with how man should act toward God. Man must follow, said these religions, certain customs because these customs pleased God. Man must go through certain forms; he must be careful not to make his god (or gods) angry. Even to-day, some of the leading religions are mainly concerned with such matters.

But the Christian religion, which has its roots in the Jewish religion, emphasizes even more than does the Jewish religion the duty of man to be merciful, just, wise, kind, helpful. Jesus made an amazingly simple summary of His teachings when He said:

> Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind. This is the first and great commandment. And the second is like unto it. Thou shalt love thy neighbor as thyself. On these two commandments hang all the law and the prophets.

The activities of the church. — Once we have seen that our churches are really all working at the same task — the task of passing on to men a religion demanding right living and right acting — it is easy to understand the devices they use in that task. The gathering of the congregations for sermons or masses gives chances for the message to be sent on. Such groups as the King's Daughters, the Christian Endeavor, the Epworth League, the Sunshine Society, and a host of others turn the thoughts of their members in the desired directions. The Men's Club, the Knights of Columbus, the Church Club, and other organizations bring groups together outside the church building for recreation or for discussion of questions of the day. Possibly the most important single activity of the church as a torchbearer is the Sunday School, since here the younger and more plastic members are very definitely shaped by the elders.



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MEMBERSHIP IN THE MAIN RELIGIONS IN OUR COUNTRY

It would take pages to catalog all the activities of the church as a torchbearer. No two churches do their work just alike — and that is as it should be. Just as the needs of

to-day are different from those of one hundred years ago, so the work of a church that serves a country district may well be somewhat different from the work of a church that serves an immigrant population in a crowded city. This latter church is likely to do a great many things and to become what is known as an "institutional church." It provides libraries, chess rooms, bathing rooms, bowling alleys, club rooms, playgrounds, schools — anything and everything that, at any hour of the day or night will draw in people who can be shaped or molded.

Young people's groups act as torchbearers. — In addition to the molding or shaping of the younger generation by the elders in family, school, and church, there is a whole host of groups in which the boys and girls do their own shaping — generally, it is true, with some guidance from their elders. There are various groups ranging from the street "gang" up through the ball clubs, the playground groups, the boy scouts, the campfire girls, and all the rest of them.

Boy and girl scouts. — What the boys' and girls' groups at their worst can do is seen in the lawless street gangs. What they can do at their best is seen in the work of the Boy Scouts, the Campfire Girls, and similar groups. Let the Boy Scouts speak for themselves in the statement on the opposite page, taken from their manual.

The playground groups.—Recreation and play relieve the strain of modern complex life. They relieve the monotony of modern factory and office work. They help to make healthy bodies and happy minds in young and old alike. These are good reasons for having our parks, theaters, bathing beaches, and roof gardens. But there is still another reason for them and for the playground movement that has swept over the country in the last generation. Organized play is one of our best torchbearers. In organized play we

LAWS OF THE BOY SCOUTS OF AMERICA

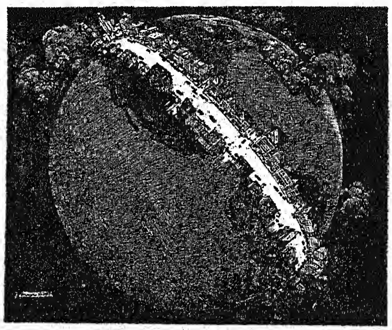
1. **A scout is trustworthy.** A scout's honor is to be trusted. He does not violate his honor by telling a lie or by cheating or by not doing a given task when trusted on his honor.
2. **A scout is loyal.** He is loyal to all to whom loyalty is due: his scout leader, his home, his parents, and country.
3. **A scout is helpful.** He must be prepared at any time to save life, help injured persons, and share the home duties. He must do at least one good turn to somebody every day.
4. **A scout is friendly.** He is a friend to all and a brother to every other scout.
5. **A scout is courteous.** He is polite to all, especially to women, children, old people, and the weak and helpless. He must not take pay for being helpful or courteous.
6. **A scout is kind.** He is a friend to animals. He will not kill nor hurt any living creature needlessly but will strive to save and protect all harmless life.
7. **A scout is obedient.** He obeys his parents, scout master, patrol leader, and all other duly constituted authorities.
8. **A scout is cheerful.** He smiles whenever he can. His obedience to orders is prompt and cheery. He never shirks or grumbles at hardships.
9. **A scout is thrifty.** He does not want to destroy property. He works faithfully, wastes nothing, and makes the best use of his opportunities. He saves his money so that he may pay his own way, be generous to those in need, and helpful to worthy objects. He may work for pay but must not receive tips for courtesies or good turns.
10. **A scout is brave.** He has the courage to face danger in spite of fear, and to stand up for the right against the coaxings of his friends or the jeers or threats of enemies, and defeat does not down him.
11. **A scout is clean.** He keeps clean in body and thought, stands for clean speech, clean sport, clean habits, and travels with a clean crowd.
12. **A scout is reverent.** He is reverent toward God. He is faithful in his religious duties and respects the convictions of others in matters of customs and religion.

learn to act in coöperation with others; to be governed by the rules of the game; to sacrifice our own pleasure or vanity for the sake of the team's success. Some one has said that the "sacrifice hit" of our baseball games teaches us one of the best lessons we learn. There can be no doubt that coöperation, obedience to rules, and self-sacrifice are emphasized in our organized play. And there can be no doubt that these qualities are needed in living together well.

Courtesy of Monroe: Encyclopedia of Education

ORGANIZED PLAY: VOLLEY BALL

Publishing is a way of passing on the torch. — Our account of the ways by which our thoughts and actions are molded would be quite incomplete unless we again mentioned our floods of printed communication. The amount of this communication is so large that the figures mean almost nothing to us. One way of putting it is to say that every day five hundred acres of timber march into the jaws of our paper-making machines to give us the paper for our printing. And

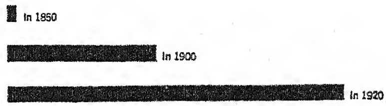


Courtesy of the General Electric Co.

The wood used to make print paper for the United States every year would make a heavy plank road sixteen feet wide around the world.

the amount grows every year. The world of sixty years ago would have laughed at anyone who ventured to predict such floods of printing as we make use of to-day.

The work of the newspapers and magazines. — Our newspapers and magazines deal mainly with the happenings of the day. The time was when newspapers were small sheets of which a very few hundred copies were made for the local community. That time was only two or three generations ago, but it has almost disappeared from memory. The newspaper of to-day tells of everything and it reaches millions. It has sections for domestic news, foreign news, financial news, sports, society, theaters and amusements, and real estate. It gives space to literature, editorials, education, and the "funnies." It has something of appeal to everyone from the child of two to the man of one hundred. While its main concern is with the present, it does not hesitate to delve into the past or to peer into the future. Our weekly and monthly magazines also have matters of interest to everyone. They watch the men who serve the public,



THE INCREASE IN THE NUMBER OF NEWSPAPERS PRINTED EACH DAY IN THE UNITED STATES

FLOODS OF PRINTED COMMUNICATION

(These figures are for the United States alone)

700 magazines for farmers
300 magazines for children
2,500 daily newspapers published
15,000 new books printed every year
40,000,000 newspapers printed every day
20,000 periodicals of all kinds published
1,100,000 tons of paper used every year for books
1,500,000 tons of paper used every year for newspapers
95,000,000 monthly magazines printed each month
55,000,000 weekly magazines printed each week

suggest public improvements, deplore failures, tell of great discoveries and inventions, and, in general, keep us in touch with the world's progress.

Books and libraries. — As for our books, they are fairly permanent and thus reach over the generations better. Some one has said, "The book is the memory of the race." It is certainly true that the written, and later the printed, record has been thus used from the time of earliest writing. The baked clay books and the papyrus and parchment rolls that have come down to us from Nineveh, Egypt, Greece, and Rome are like mirrors in which we see how those peoples lived, what they thought, how they were governed, and to what they aspired. What has been true of the books of the past will be true of those of the future. They will be a part of "the memory of the race."

What books have meant and still mean to us may be seen from the use of libraries. There were collections of books in the temples and palaces of all the earlier civilizations. The monasteries were the refuges of scholars and the keepers of books during the Dark Ages following the fall of Rome. Then the universities took up the task.

To-day, with our floods of printing, libraries have increased enormously. There are college and university libraries; national, state, and city libraries; privately endowed libraries; school libraries. There are libraries of law, medicine, history, commerce, agriculture, and engineering. And their size is staggering. A first-class university library of to-day calls for 1,000,000 volumes. The New York Public library has 2,800,000 volumes, the Library of Congress has 3,000,000, and these are smaller than the British Museum and the Bibliothéque Nationale (National Library) of Paris. Furthermore, all libraries are growing at such a rate that it is a real problem to know how to manage the books.

We must not think of our libraries as mere storage places for books. Far from it. They coöperate with the public schools and with government officials. They provide special reading for children, for clubs, for business men, for immigrants — for everyone. They conduct lecture courses and maintain exhibits. One can hardly think of a thing which some librarian somewhere is not doing to make the memory of the race available for our use. Books and libraries are among our greatest torchbearers.

A REFERENCE LIBRARIAN

Summary of the work of our torchbearers. — We have not made a complete study of our torchbearers. Several have not even been mentioned in this chapter. But we have gone far enough to see what is being done by some of our institutions today in shaping us to live in society. Of these, the most powerful is the family. It is the most powerful because it touches us when we are most plastic; because many of the other agencies work through it; and because we trust it so completely that we do not resist its shaping work.

The school and the church, taken together, are almost as powerful as the family. As well as we can judge, we are to rely upon the school more and more in the future. We are to rely upon our higher schools, the universities, to discover new scientific treasures — to lead in harnessing nature. We are to rely upon schools of all kinds, elementary, secondary, collegiate, technical, to serve in passing on the stored-up wisdom of the race.

An honorable place as torchbearers, too, must be given to the boys' and girls' groups, of which there are so many kinds.

As for our printed torchbearers, we are greatly indebted to them. They re-create and inspire us. They circulate the wisdom of the race. They tend to bring about a oneness of our own people, and indeed of the peoples of the whole world.

Problems

1. What lessons do you draw from the accounts of feral persons?

2. Look up the work "instinct" in a dictionary. Show how instincts are useful to us. Show that some instincts should be governed or controlled. Does the school make any use of our instincts in training us? How about the play instinct?

3. Suppose that Neanderthal man had had only instincts, with no ability to change. What would our living be like to-day?

4. What industrial arts have you learned? Where did you learn each one? What proportion of them was learned in the family?

5. "One of the most important things the family does is to take care of the young." Show why that is so important.

6. In what ways, according to your friends, are you like the other members of your family? Make a list of the opinions and preferences you have that are like those of your parents. Make a list of those that are different. See page 312 to get a start.

7. Why is it so important to-day to have older and experienced friends (our teachers) as guides?

8. Work through the questions on pages 315 and 316.

9. Write out an argument for having vocational courses in the schools.

10. Write out an argument for having in the school a school paper, a literary society, an engineering club, a musical club.

11. Why is it wise to have free schools? Why is it wise to have compulsory schools? Why is it wise to have high schools?

12. Write out a list of reasons why it will be best for you to go through high school. Make another list why it will be best for you to go through college.

13. Write out an argument for having continuation schools for pupils who must drop out of the regular schools.

14. Draw up in three columns the main ways by which the stored-up experiences of the race were passed on (a) among the Iroquois, (b) in the colonial farm family, (c) in the United States to-day. Why do we need more ways of passing on the torch than did the Iroquois or the colonial family?

15. "When we do our school work well, we are helping to do the work of society." Why?

16. Make a list of things done by your church which are not mentioned in the text. Point out how each of these things is an aid in torchbearing.

17. Why is a religion that includes morality and ethics more worth while than one dealing solely with the worship of an unseen power? If necessary, look in a dictionary to find what is meant by morality and ethics.

18. Read through the twelve boy scout laws. Does the family also try to get a boy to carry out such laws? Does the school? Does the church?

19. In what ways do the Y. M. C. A. and the Y. W. C. A. act as torchbearers? Is that their main task?

20. What did the writer mean by saying that the "sacrifice hit" in our national game, baseball, has had a great influence on our national character?

21. Give five illustrations of coöperative action in games you play; five illustrations of the need of obeying law; five illustrations of following leadership; five illustrations of individual sacrifice for the good of the team.

22. It is said that almost six hundred cities in the United States to-day have public playgrounds. Defend the expenditure of public money for this purpose.

23. Pick out in to-day's paper five things that help in passing on the experience of the race. Pick out five things that are likely to affect public opinion about the problems of the day.

24. "Our habit of reading newspapers has helped to make us one united people." How so?

25. The account of our torchbearers in this chapter was incomplete in that it said nothing of the ways by which our business houses pass on the stored-up experiences of the race. What are some of these ways?

26. "Our knowledge can accumulate like a huge snowball, each generation of men adding something to it." Show that this is true.

27. Answer the questions at the beginning of the chapter, page 301.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter X.

1. The Story of Paper Making (how paper is made: the enormous quantity used).
2. Books and How They Are Made (the author, the publisher, the typemaker, the printer contribute to the "memory of the race").
3. The Newspaper (its origin: what it is: how it is made).

See also:

Chapter II, 2. Woman's Share in Primitive Culture (early division of labor).

Chapter VII, 2. Feral Man (what happens to persons who do not communicate with others).

Chapter XIII, 3. Woman's Place in Modern Culture (the tasks and opportunities of woman in our society).

Chapter XIV, 1. Some Early Forms of Social Control (myths, magic, fetishism, totemism, and taboo).

Chapter XVII, 1. The Development of Ideals and Aspirations (what we owe Greek, Roman, Jewish, and Teutonic cultures: later forces developing ideals).

Problems to think over are given in these reading selections.

CHAPTER XI

COMMUNICATION AND LIVING TOGETHER WELL

A. Command of Language and Living Together Well

B. Our Mechanical Communicating Devices and Living Together Well

C. Torchbearing and Living Together Well

D. Ideals, the Guides of Communication

Questions to Keep in Mind while Reading This Chapter

1. What may we expect of future communication through language?
2. What may we expect of the future as regards the conquest of distance?
3. What are our duties and opportunities as torchbearers for later generations?
4. Can communication be used harmfully? If it can, what is to be done about the matter?

In this chapter we shall study four great factors in living together well. — As a result of our study of how man multiplied his powers by harnessing nature, we were able to make five statements (page 180) about our living together well.

Now that we have seen how man has multiplied his powers through communication, we can make additions to this list. These additions are the subject matter of the present chapter.

6. How well we shall live together depends upon the effectiveness of our language devices.

7. How well we shall live together depends upon the effectiveness of our mechanical devices for communication and trade.

8. How well we shall live together depends upon the quality of our torchbearers.

9. How well we shall live together depends upon whether man, the communicator, is guided by good ideals.

A. Command of Language and Living Together Well

(How well we shall live together depends upon the effectiveness of our language devices.)

Language is by far our most important means of communication. Since this is true, our living together well in the future will surely depend upon our having good language devices. There are two matters to discuss in this connection: (1) How may we expect the English language to develop? (2) What is there for you and me — every one of us — to do about our own use of language?

The English language can be improved. — Let us begin by thinking of the possible development of the English language. What may we expect of it? Can it be made into a better tool in the future? We already know (pages 215 and 216) that language is a sort of living thing. It shrinks; it grows; it changes. One way of seeing how much it can change is to look at this selection from Chaucer's *Canterbury Tales*. It was written in our own language of some 500 years ago:

> Singinge he was, or floytinge, al the day;
> He was as fresh as is the month of May.
> Short was his goune, with sleves longe and wyde.
> Wel coude he sitte on hors, and faire ryde.
> He coude songes make and wel endyte,
> Iuste and eek daunce. and wel purtreye and wryte.

That selection would be printed to-day thus:

> Singing he was or whistling all the day;
> He was as fresh as is the month of May.
> Short was his gown, with sleeves long and wide;
> Well could he sit a horse, and finely ride;
> And songs he could compose and well indite,
> Joust and eke dance and well portray and write.

The change is certainly quite a large one. Yet the age of the *Canterbury Tales* is not very great, as we have learned to think of the life of our race.

We must, then, expect language changes in the future. They will be so slow that we can hardly notice them, unless, indeed, science steps in. The scientific students of language (language has its scientists just as truly as has chemistry or history) point out that our language has "just growed," like Topsy of *Uncle Tom's Cabin.* It has not been "thought out" very much. The result is that it has some defects. These scientists point out that the physicist can make good rules of action about machinery; the chemist can give rules of action about making substances; and the language scientist can give rules of action for making our language serve us better than it now does.

ENGLISH SEEN AS UNIVERSAL TONGUE FOR WORLD RADIO

NEW YORK, March 25.—(By the Associated Press.)—There is at least one industrial leader in America courageous enough to believe that the wizardry of radio, already arousing the curiosity of the human race to high pitch, eventually may bring about a universal tongue.

Guy E. Tripp, president and chairman of the board of the Westinghouse Electric and Manufacturing company, recently expressed this opinion at a dinner of the Maine Society of New York preferring to believe, however, that instead of having to construct an artificial language for the purpose, English would be the new world tongue.

Foresees Confusing Chatter.

Mr. Tripp, whose energies in developing radio have accomplished astonishing results, and who may be described as a "practical dreamer," foresees the day when Europe, Asia, Africa and America will be enmeshed in radio waves bearing incessant chatter in mixed and confusing tongues, with the resultant human curiosity to learn what is being said one to the other over vast expanses of land and water.

Hence, his belief that one language alone can satisfy when this time arrives.

Certain language changes have been proposed. — There has been much talk at one time or another of making changes in our language. Probably you have heard of "simplified spelling." It is argued that it would be easier and simpler for us to get command of language as a tool, if all words were spelled according to a few simple rules. Very likely you have also heard of such "universal" languages as Esperanto and Volapük. The hope of the advocates of a universal language is that it may become the means of easy communication

between peoples who now speak different languages. Simplified spelling and universal language are only two samples of ways that have been suggested for making language simpler and more effective.

Such movements have not yet won their way. Perhaps the ones just mentioned never will. Perhaps they are only man's "first fumblings" in the matter of language improvement. Man fumbled a long time with the steam engine, the telegraph, the telephone, and the locomotive before he hit upon the "right" ideas. Perhaps he is now in the fumbling stage as far as language is concerned.

Why not have the guidance of science in this matter? — This much is certain. There is just as good sense in having a body of picked scholars studying and reporting on wise language changes as there is in having commissions making studies of banking systems, employment exchanges, wastes in industry, plans of school systems, or a hundred other subjects that are much studied to-day. At first, this seems rather strange and almost startling. But when one thinks it over a bit, one sees it is quite sensible. Language is so important to us that it should be made just as effective as possible. Why not let science help to make it effective?

Wouldn't it be interesting if we could see these paragraphs written in our language of a thousand years hence? Whatever they would look like, we are reasonably sure that a thousand years will see vast improvement in this multiplier of man's powers. Perhaps a hundred years will do so. There are certain "fumblings" and other "signs of the times" indicating that science may be almost ready to turn its light on this part of man's progress. Why not? We need only to make certain that we are following science and not foolish fads. Our associations of scholars can save us from that error.

Everyone should strive to increase his command of language. — No matter what happens to the English language, every one of us should strive to increase his command of that language. Remember that language is a tool to think with. Remember that it is a tool for communicating with others. Do we wish to think as well as we can and to get the thoughts of others as well as we can? Certainly.

Language and making a better living. — The ability to think and to keep in touch with the thoughts of others is very important in making a living. Anyone can see this is true of the work of such persons as scientists or statesmen or inventors. Pasteur, the great scientist who revealed germs to us, was noted for his ability to "pick the brains" of his fellow scientists. Roosevelt was always reading and talking problems over with others. Stephenson, the inventor of the locomotive, had little schooling, and he found that he had to study the thoughts of others as stated in mathematics and science if he was to succeed.

What is true of our great men is just as true of the rest of us. A young fellow, whom we shall call Willard Smith, works in one of the huge plants of Youngstown, Ohio. He began as a day laborer; became a semiskilled workman; then, a skilled mechanic. He is now a foreman and is soon to become an assistant superintendent. When the manager of the plant was asked why Willard advanced so rapidly, he said, "Oh, he uses his head. He knows what to do, and how and when to do it. He uses his head." That tells the story. But behind that story is another story. It is a story of the hours Willard spent in a continuation school, in taking work with a correspondence school, and in talking problems over with fellow workmen. "He uses his head," and language — words — are the tools he works with in using it.

Language and increased ability to think. — Take another case. Helen Keller was both deaf and blind. She had no words until a skillful teacher showed her that there were such things. Miss Keller has told her own story. She tells how her mind had little to work with before she was given words. She tells how a new world opened up to her after she learned that things had names. She began to use those names — words — to think with. Without words her mind was starved. When fed with words it grew wonderfully.

Courtesy of Cubberley: The History of Education, (Houghton, Mifflin Company)

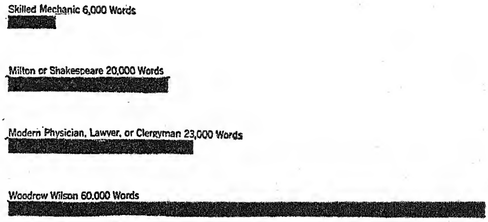
A Medieval Disputation

This old print shows a scholar of a medieval university defending his position against the criticisms of others. It was one way to arrive at the truth.

Suppose that you or I, at home or at school, come upon a new word, such as "lens." It takes us some little time to make out just what that word means. We ask older people about it; we notice how it is used in sentences; we consult the dictionary; and finally we get the *idea* expressed by that word. Then we begin to use the word as a tool to think with. "Lens," for example, helps us in thinking about the use of a microscope, a telescope, a camera, a pair of glasses, a sun glass, a bull's-eye flashlight or lantern, or a moving-picture machine. Clearly, the more words we have, the more ideas we have, and the better we can think about various problems.

All we have said may be summed up thus: we increase our powers when we increase our command of language. We in-

crease our power to think; our power to make a living; our power to be of use and service to others. Increased command of language comes in two ways: (1) by increasing the number of words one can use, and (2) by increasing one's skill in using words in sentences. Our teachers of literature and composition and foreign languages are all helping us to increase our command of language. But, of course, they can help us little unless we coöperate with them. They only help us to make a good start. We need to keep at the task ourselves all the rest of our lives.



Some Sample Vocabularies

How well we shall live together depends upon the effectiveness of our language devices. The devices should be good. Our command of them should be good.

B. Our Mechanical Communicating Devices and Living Together Well

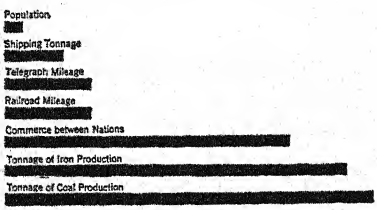
(How well we shall live together depends upon the effectiveness of our mechanical devices for communication and trade.)

Ability to harness nature has given the world a great ability to communicate and trade. — Books in physiology have made us familiar with the thought of our veins and arteries as a sort of transportation system of the body. The arteries carry "supplies" to every point; the veins carry away the used tissues. We are familiar, too, with thinking of our nerves as the telegraphing system of the body.

In this world of ours we find something similar. Highways, steamship lines, auto-truck lines, and railroads carry

supplies to and fro and enable the different parts of the world to trade and grow and prosper. Telegraphs, telephones, wireless, and the slower mails carry news and orders about and enable the parts to work in some harmony. It is easy to see that this is important and will continue to be important.

Will man be able to improve such devices in the future? Will he be able to expand his use of such capital goods (see page 195)? Of course, no one can *know* the answer to that question, for no one can know the future of science and invention. But there is every reason to believe that man is only in the beginnings of effective communication and trade.



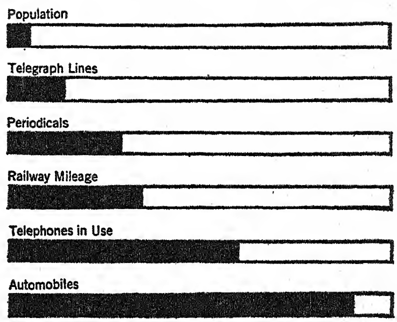
ONE HUNDRED YEARS OF THE WORLD'S PROGRESS

The world has increased such devices enormously in the last one hundred years. As the chart shows, there are less than three times as many people on the earth as there were one hundred years ago. But the tonnage of the world's ships is ten times as great; the production of iron is sixty times as great; the production of coal is sixty-five times as great; the railroad mileage and the telegraph mileage are fifteen times as great (although we use only seventy years when we compare these); the commerce among nations is fifty times as great. The fact that commerce has increased fiftyfold while population has increased only threefold shows that man has to-day greater power to live well.

America has its share of these devices. — As for our own country, our need of conquering distance has caused us to have our full share of the world's communicating and trading devices. Although we have only about six per cent of the world's population, we have over sixty per cent of its tele-

phones, nearly ninety per cent of its motor cars and trucks, almost thirty-five per cent of its steam railroads, over thirty per cent of its periodicals, and almost fifteen per cent of its telegraph lines. No other people is more able to move goods or to send messages from place to place.

This rapid progress of the past is still continuing. Just to amuse myself, I watched my newspaper for a few days to see what news items I could find about man's conquest of distance. The list of these news items was so surprisingly long that I cannot give it in full. It had such items as these: The first airplane mail service from New York to San Francisco was put into effect and the mails crossed the continent in a little over twenty-six hours. What a miracle that would have seemed to those pioneers of only seventy years ago who could not get letters in months! An aviator learned of the serious illness of his father and flew eight hundred miles one night to see him. A fleet of motor trucks was installed to carry fruits in fresh condition from a fruit belt to a city eighty miles away. A state published a map of its highways. It showed that railroads and fast automobile roads made all parts of the state accessible. Even the ordinary dirt roads would have seemed marvelous to our colonial ancestors. A cable company put the eighteenth cable across the Atlantic. It was a greatly improved cable. It could send more messages and faster messages than any other cable. A railroad placed an order



America's Share of the World's Communicating Devices

Each whole rectangle represents a total for the world. The black part of each rectangle shows the share our country has.

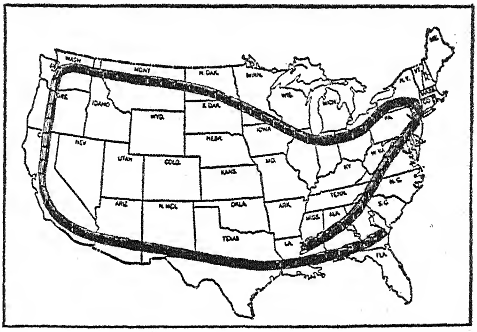
with a firm of builders for more powerful locomotives and larger cars. These few samples of the news of a few days show that man is forging ahead in his conquest of distance.

There is almost no limit to our dreams of the future. — In these same few days there were several items in the newspaper in which guesses were made about the progress of the next one hundred years in the conquest of distance. Of course, only guesses could be made, and we must not take these guesses too seriously. They merely show of what man is dreaming.

> **WHY DARK AGES RULE IN CHINA**
>
> China's backwardness in almost every field of human endeavor may be traced to the lack of modern transportation. In China the man, or coolie, is the beast of burden, and although human labor in China is cheaper than anywhere else in the world, transportation of merchandise is higher than in any other country.
>
> **Primitive as 1,000 Years Ago.**
>
> The Chinese government, even under the best of conditions, has never been able to eliminate the bandit menace . . . . and the reason is primarily lack of roads. For hundreds of miles on each side of the railroad the only means of transportation is the donkey, wheelbarrow, or sedan chair. This section, which is typical of many in the interior of China, has never been touched by western civilization and is as primitive as conditions were in Europe a thousand years ago.
>
> **Do Not Know Own People.**
>
> As a result of this difficulty of transportation, the average citizen of north China never sees south China and a resident of Canton never gets to Peking. The result is absolute ignorance on the part of the Chinese generally regarding their fellows in other sections of the country and as a result of ignorance there is suspicion and hostility.

One writer pictured everybody having vest-pocket radiophones through which he could communicate with everyone in the country. Another thought that in a hundred years the postal service would be practically abandoned because letters would be too slow and clumsy a way of sending messages any distance. Another pictured a merchant in Chicago needing a shipment of goods from China. The merchant placed his order by radio, and a freight airship delivered the goods that same day, having traveled at the rate of 1,000 miles an hour, using atomic energy (see page 194) as power. Another thought that newspapers would cease to be used because they were clumsy and wasteful. Another spoke of starting around the world with the rising sun and arriving back at his starting point before

dawn the next morning, thus moving faster than the earth turns on its axis and "beating the sun in the race." Still another pointed out that we should do well not to smile at such strange suggestions. He said that the progress of the last hundred years has far surpassed all such "wild guesses" of the past. The wildest dreams of a hundred years ago have fallen far short of what has actually happened. "Why may not the same thing be true of the next hundred years?" he asked



Courtesy of Railway Age.

WE MOVE ENORMOUS MASSES OF FREIGHT

If the freight loaded every week in the United States were put into one train, that train would reach around the country and overlap 200 miles.

Perhaps it will be well for us not to try to "lift the veil of the future" too high. Who can predict the path of science and invention? Nevertheless, our study of man, the harnesser of nature, has given us faith that he will make the future of man, the communicator, far more wonderful than the past has been. It has given us faith that we *can* have abundant capital goods to carry on our communication and trade.

There are, however, serious problems ahead. — It is not sufficient that we should be *able to* make plenty of such capital goods for the future. We must, in addition, be wise in our use and management of them.

Such communicating devices are, in the main, what we call public utilities. That means they are businesses so vital to the whole people that we supervise them more than we do ordinary businesses. Right here is one of the hard problems

of our day. Some persons think that we ought to have the government own and manage these public utilities. Others say that we should continue our present plan of considerable supervision or regulation of them. Others say that our present supervision is too severe and that we are discouraging business men from building the communicating devices we need so badly. There is great confusion and clamor and argument about the matter. It is a "problem of the day."

It is a problem too big for us to "settle" in our present study. All we can do is to see its outline. Whether we shall live together as well as we should depends upon whether we handle it wisely. If we do not, our *ability* to harness nature will not help us as much as it should in developing our mechanical devices of communication and trade.

C. Torchbearing and Living Together Well

(How well we shall live together depends upon the quality of our torchbearers.)

When we talked in the last chapter of the work of the family, the school, the church, and the press, we tried to see these torchbearers as they would be when working at their best. We tried to see what their task is in our society. We did not stop to point out that these torchbearers do not always perform their task well. We did not mention the serious problems that arise in connection with these torchbearers. These problems are so numerous and important that you will be hearing of them and thinking of them all your life.

Serious problems confront our schools as torchbearers. — What is the situation in our schools? What may we expect of schools of the future? When we think how new our free compulsory schools are and how much they are accomplishing, we have a sense of pride. But that pride should not make

us blind to their defects. There are several problems in our schools needing attention.

1. **Our people do not get enough schooling.** — To begin with, we are not getting as much training as we should. A few years ago a commission made a study of our educational system. It found that not over one per cent of our workers in agriculture, in manufacturing, and in mechanical shops had been well trained. Think of the vast human resources thus wasted because of lack of training! (see page 200). This commission also found that too small a proportion of our young persons between fourteen and eighteen years of age were in a high school of any kind, public or private.

Some consequences of dropping out of school. — Let us see what happened to one boy who left school early.[1] John Williamson, who was in the sixth grade, made up his mind he wanted to go to work. His parents did not need the small amount of money he could earn, but they did not realize how important it was for him to continue his school work. They allowed him to drop out. In the state in which he lived, he could get an employment certificate because he was fourteen years old. He got a position as a messenger boy.

At first he found the work very interesting. But after a few years it became tiresome and monotonous. John found, too, that his job was not one in which there were rapid increases in the rate of pay. After he had been a messenger boy for five years, he got but little more than he did the week he started. He thought of looking for another job, but he hesitated to do so. He saw that he had not carried his school work far enough to be fitted for positions that paid well. He was not left to decide the matter for himself. One day the manager of the office called him in and told him that he would not be needed any longer because the company was

[1]Adapted from Lesson C-8, *Lessons in Community and National Life*.

taking on some younger boys at about the same pay at which John started. He was sorry he had dropped out of school.

Or take the story of John Panello.[1] One February he was graduated from the grammar schools of New York City. He got his "working papers" from the board of health and began to look for work. After three weeks of looking, he got a job as errand boy for a dyeing and cleaning establishment. At the end of one week the boy who had had the job before came back, and John was "fired." After a day's hunt, he was taken on by a firm manufacturing ladies' hats. Here he swept the floor, ran errands, and helped to pack. At the end of two weeks he left because he learned that another boy who had been there four years was still getting low wages.

EDUCATION PAYS

Young Farmers Find That to Be the Fact.

"In dollars how much does education increase the earning capacity of the young farmer?" is a question asked by some of the state agricultural colleges. The Georgia agricultural college collected the facts from 1,271 farmers of that state and found that those who had no schooling earned on an average of only $240 a year, those with a good common-school education earned $565 a year and those who had completed a high-school course averaged $664. The men who had completed an agricultural short course and those who had graduated from the agricultural college were earning an average of $1,254 a year. The Kansas agricultural college had 1,237 reports. The average young farmer with a common-school education earned $422 a year, the high-school graduate $554. The men who had taken a short course in agriculture earned an average of $859 a year and the college graduate $1,452.

His next job was with a millinery firm. At first he "went for stuff to the first floor," then he ran a crimping machine, then he "got the cord downstairs for the men who make rugs." After a week and a half of this "another feller asked him to come along and learn carpentry," so he took a job at loading and unloading wagons for a firm that made wooden boxes! When he learned that the firm was to move to Staten Island, he quit, having held the job for two weeks.

During the next three weeks, John did five different kinds of work for a manufacturer of jewelry and notions. Then another man said, "Come along. I have an office job for you." This office job meant that he acted as shipping clerk and errand boy, answered the telephone and swept the floor for a

[1]Adapted from Lesson B-8, *Lessons in Community and National Life.*

manufacturer of artificial flowers. There he stayed some time, getting five dollars a week, although he did not think much of the job. "What can I learn?" he asked — but found no answer.

Some gains of longer training. — Compare these accounts of John Williamson and John Panello with what happened *to a whole graduating class* of a school where the boys, while working, went to school part time and got more training for their life work. This line ———————— illustrates the wage they were getting per week when they entered the continuation school. This line ———————————————————— shows their weekly wage after only a little over two years of part-time schooling. Would John Williamson and John Panello have done well to have attended this school? Of course, full-time schooling would have been even better than part-time schooling. It would have been better not only for making a living but for other aspects of living together well.

2. **The training in the schools should be improved.** — In the case of those who do attend school, there is reason to ask for improvement in the school work. Our scientists in education agree that our courses of study have not developed as fast as the conditions of living have changed. That is not surprising; conditions of living change so rapidly that it is not easy to keep our training systems up to date. Many schools have not yet been able to deal properly with the matters mentioned on pages 314 to 317. Our experts also agree that buildings and equipment should be improved and that in some cases the salaries of teachers are too low to justify the expense of getting proper training.

Our ideals for our schools have not been high enough. We have not fully understood how important their work is. When there are courses of study that are not as helpful as

they might be; when the laboratory and library equipment is scanty; when the pupils "go to school" without even understanding why society wants them to do so it is not surprising that too much of our school work seems dull and stupid. Too often we "listen" instead of "do" or "take part." Too often we "go through motions" instead of taking an active part in the work of the school which is such a vital part of the life of our society.

Distinguished Men of America and Their Education

Of each million with no schooling
6 attained distinction
Of each million with elementary schooling
24 attained distinction
Of each million with high-school education
622 attained distinction
Of each million with college education
5768 attained distinction

The person with no schooling has
1 chance in 150,000 of distinguished service
The person with elementary schooling has
4 times that chance
The person with high-school education has
100 times the chance
The person with college education has
900 times the chance

What you and I can do to make the schools better torchbearers. — There is a great deal you and I can do about such problems, both now and in the future. What we can do right now is to buckle down to our school work both for our own sake and for the sake of society. As for the future, the time is to come when our own children will be attending school. What kind of buildings and laboratories and libraries will they have? What kind of teachers? How easy will it be made for them to continue in school long enough to get good training? Shall we be willing to pay enough taxes to meet the needs of the case? Shall we be ashamed to spend for this torchbearer only the amount of our annual tobacco or chewing-gum bill?

Serious problems confront the family as a torchbearer. — The future of the family is being much discussed by the adults of to-day. Most of them are frankly disturbed. Many of them think the family is a poor torchbearer. Since the family is our most important social institution, it is worth

while to see why these persons are disturbed. What are the weaknesses and dangers of the family to-day?

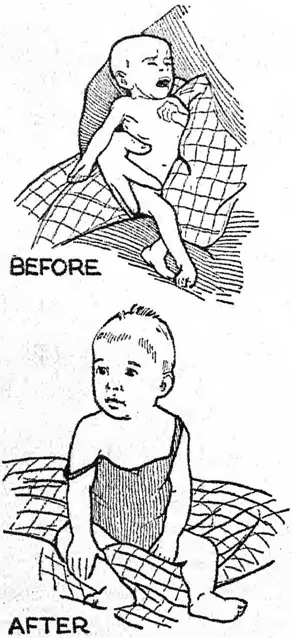
1. **Ignorance causes some families to be poor torch-bearers.** — Some homes fall short of being a good place to train plastic youth. The trouble is that some parents, although they love their children, are ignorant of the right ways to rear them. On the physical side, unclean surroundings, poor air, and improper food and clothing cause many children to die quite unnecessarily and handicap many who live by giving them weak bodies. On the mental side, some parents, because of their poor training, cannot give the needed training in good customs and habits. They pass on to the children poor customs and silly superstitions.

They are like the tribe of Indians who controlled their children by having some of the elders dress as dreadful goblins and pretend to look for children to devour. The parents would pretend to fight them off. Thereafter, any mention of "giving the child to the goblins" would indeed keep him quiet, but he was always haunted by foolish fears. Some parents to-day do almost as foolish things, not because they are cruel but because they do not realize that frightful memories will always lurk in plastic minds and cause fear of the policeman, the dark, goblins, ghosts, or what not. There are enough real troubles in the world without having such foolish fears added.

Parents, no matter how good their intentions, cannot do better than they know how to do. Fortunately, the situation is improving. Our city health work, the Federal Children's Bureau, our visiting nurses, and many other agencies are spreading knowledge of better care of babies, with the result that the death rate is falling (see page 152) and health is improving. So, also, but more slowly, the knowledge is spreading that the growing mind needs as careful attention

as the growing body. We are learning not to fill the plastic mind with foolish fears and superstitions, or with poor ideals.

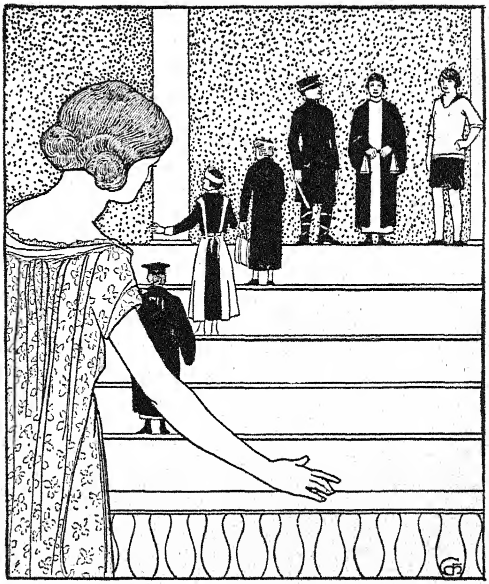
Our progress in this field need not be as slow as it is. You and I could help wonderfully. Imagine the great change that could occur if every boy and girl in the public schools would, from this day on, take good care of his or her younger brothers and sisters, and, later, of his or her own children. In a short time there would be a new world.



THE RESULT OF ONE PIECE OF CHILD WELFARE WORK

2. **Does the new position of woman harm the family as a torch-bearer?** — It is said that the new position held by woman in our society is hurting the family. More and more, she is finding work that takes her outside the home. The coming of the power-driven machine has created many tasks as machine tenders for which the strength of women (and children) is sufficient. The factory has taken over much of the sewing, canning, and cooking the woman formerly did in the home, and she has followed this work and other work to the factory. In the last fifty years she has had more chance to get an education. Her education has made her available for clerical duties in business and for professional work, such as law or medicine. She has become interested in club work, civic work, political activities, etc., to all of which she is now admitted. All this, it is said, is causing her to neglect her "natural work" in the family circle.

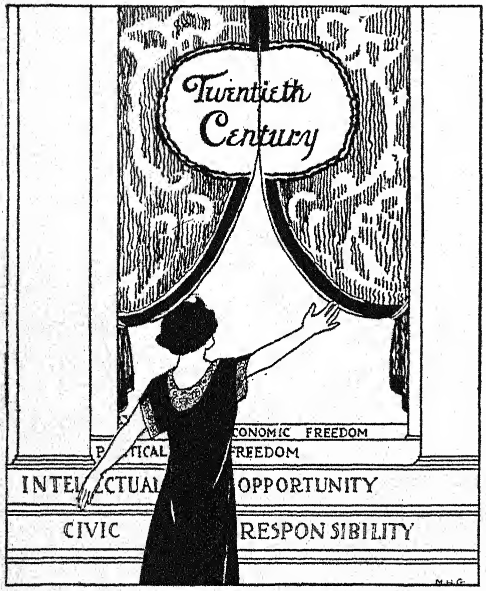
There is some truth in this statement, but there is a good side to the picture. To begin with, as far as "neglecting her family" is concerned, that can be true only of the woman who is married and has a family. Now, the truth is that the great majority of women who work outside the home are young unmarried women who work only during the years between the time they leave school and their marriage. It is much the smaller part of these outside workers who are married and have families. Do these neglect their homes? Some do, willfully. Some do because they must work to help support their children, if that can be called neglect. But most of them have become better fitted to train children. As we have seen (page 310) the family has become less and less a miniature of the whole society. The mother who has seen something of the parts of our society that are outside the home is better fitted to train her children to do the work of society.



WOMAN FINDS NEW OCCUPATIONS

The new position of woman means much for good family life. The time was when she was little better than a slave; when she could own no property; when all her goods as well

as herself "belonged" to her lord and master; when she had no rights over the children; when she had no vote; when she was not admitted to the higher schools. As late as the nineteenth century, an English judge ruled that a man might beat his wife if he used a stick no thicker than his thumb! Can anyone really think that a woman in such a position would be fitted to be a torchbearer in our society? Can we regret that all this has been changed in the last two or three generations? There is good reason to believe that the ideals and aspirations of the "new woman" may produce a family life better than that of the past.



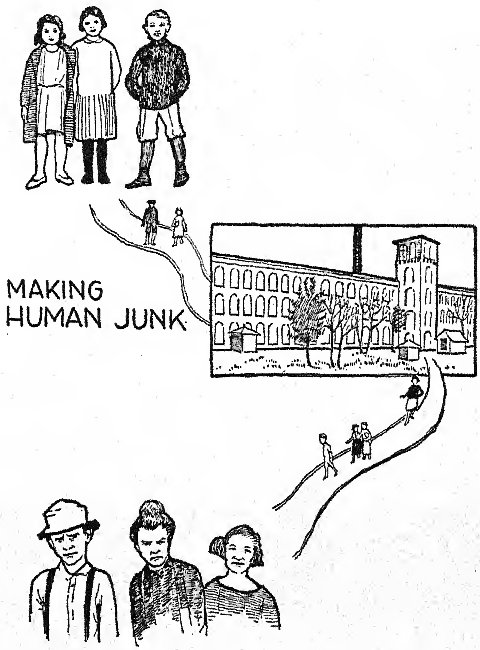
Woman Finds Her Opportunities Opening

3. **The family is endangered by poor economic conditions.** — There are bad economic conditions (such as poverty, unemployment, and work accidents) in our society, and they are hurting our family life.

Poverty.—Too large a part of our people (see page 178) live in poverty or near-poverty. This means many unfortunate things. Unsanitary and unhealthful houses together with poor and insufficient food sometimes break up the family through sickness and death. The mother is sometimes forced

to "work out" and thus is unable properly to care for her family. The father sometimes has too little time free from work to take his full part in the family life. The family income is too small and the free time of the family is too limited to enable this group to take the part it should in the civic, religious, and social affairs of the community.

Such families do not get the books, pictures, and other "culture materials" that are so important. Although our schools are free, such families cannot make the best use of them. The children go to the mills and factories at too early an age. They are irregular in their school attendance because of poor health or lack of proper clothing. All these bad conditions are quite likely to be at their worst in the crowded tenement districts where there are so many of our immigrants — the very persons most in need of the surroundings of a better American life. These are very serious statements. Too often children brought up in such conditions are unable, because of their poor health and poor training, to serve as



WHAT THE FACTORY SOMETIMES DOES TO CHILDREN

good torchbearers for the later generations. The bad conditions of one generation may too easily become the worse conditions of the next generation.

Even for families that are not ordinarily in poverty there are three great dangers through unemployment, illness, or death of the wage earner.[1]

Unemployment. — Take, as an example of the danger of unemployment, the story of a family we shall call the Wheeler family. Mr. Wheeler was a fairly good mechanic who suddenly found himself out of a job as a result of an industrial depression or "hard times." He tried in vain to find work in order to support his wife and four small children. When his savings were gone, the neighboring shopkeepers gave him credit, for they knew he was honest. The depression was a long one, however, and the Wheeler family had to give up its home, sell most of its furniture, and move into a poor district. Here, by occasional odd jobs, he and Mrs. Wheeler managed to hold the family together. But it was a hard fight, and the children suffered in health and schooling until business picked up again. This shows that unemployment may hit a family hard. Indeed the Wheeler family, thanks to their earlier thrift and prudence, fared much better than many other families have fared under similar circumstances.

> Manchester, N. H.—Ten thousand workers, one-eighth of the city's population, in the cotton division of the Amoskeag Manufacturing Company's plant have been laid off temporarily because of business conditions. Overproduction was greater than orders, a report reads. The shoe industry in this city is booming.

A SHORT NEWS ITEM WITH MUCH SUFFERING BEHIND IT

Illness. — To see what illness can do, take the story of the Swanson family. Mr. Swanson was a foundryman, and a very good one, too. His wife and three children had a comfortable, pleasant little home. Either because of some carelessness of his own or because his workplace was dusty and

[1]Adapted from Lesson C-26, *Lessons in Community and National Life.*

dark, he began to have a bad cough that the doctor discovered meant tuberculosis.

The doctor told him he must stop his work and go to a sanitarium for at least a year. His savings would not support his family for three months, to say nothing of a whole year. The sufferings of the wife and children were very great, and the family was finally broken up. There are thousands of families like it in our cities: families that are not able to be good torchbearers because the wage earner is sick with tuberculosis or rheumatism or some other disease that makes it impossible for him to earn enough for his family. Sometimes the sickness is his own fault; sometimes it results from the kind of work he is doing; sometimes the cause is unknown. The results to the family are much the same no matter what the cause may be.

Industrial accidents. — Or take this case of a family that faced a serious problem because of an accident at the father's place of work. Mr. Guardini worked in a large iron and steel plant. He and his wife and five little children were living fairly comfortably on his wages. One day a terrible accident happened in the steel mill. No one was to blame, but that was little comfort to Mrs. Guardini when her husband was brought home dead. There was enough money to pay the funeral expenses, and Mr. Guardini had some insurance from his trade-union. About the best solution Mrs. Guardini could see was to break up her family and send the children to an orphans' home. The worst that might happen seemed too terrible to think about.

The company, however, had a department called the personnel department which gave special attention to the working staff of the business. The superintendent of this department saw to it that Mrs. Guardini and her family were cared for under the state law. In that state there was a law

providing for compensation for industrial accidents — a workingman's compensation law. There was also a mother's pension law which provided that widows like Mrs. Guardini should receive payments until the children were old enough to help. Thousands of serious accidents occur in our industries every year, and not all our states have the kind of laws that saved the Guardini family from being broken up, or worse.

Clearly, there are economic conditions that sometimes make it hard for the family to do its torchbearing well. We must work to make such conditions better. Something can be done by helping unfortunate persons to become better trained, especially in health matters and in better ways of spending their wages. Our schools, churches, social settlements, charities, and others are working at that end of the problem. Society as a whole is taking action also. Public employment agencies help in bringing jobs and workers together. States provide pensions for mothers, pass laws fixing a certain minimum for wages, pass other laws providing compensation in case of industrial accidents and providing for insurance against illness or unemployment. Cities pass laws requiring good light, ventilation, and plumbing in all houses. Continuation schools are provided for those who must go to work. Trade-unions and others strive for an eight-hour day in many industries and for a living wage. Immigration is restricted.

In these and in many similar ways we are trying to make conditions safe not only for the family but also for all our other institutions. No one should claim that everything we are trying is the wisest or the very best thing that could be done. No doubt mistakes are made. But, at least, we know the problem is there, and we are trying to find a solution.

4. **Family ties may be weakened by outside amusements and unsettled homes.** — It is said that so many amusements and forms of recreation are available in our cities to-day that the family is no longer the place to which the children turn for pleasant hours. "The family has become a temporary eating and meeting place in which roomers and lodgers too frequently mar the family group" says one writer.

Courtesy of Selfridge and Company.

A Wholesome Home Group

Then, too, many families do not own their homes: they move about from house to house a great deal. They do not come to think of some one place as their "house of refuge" in which the family group has "shelter from the storms of life." A person can come to love a place. A sixteen-year-old boy had lived all his life in one house. One day, after a two weeks' absence, he suddenly turned a corner and saw his home. "Oh boy!" he said, "Good old home!" His love for the *place* helped him to be a good member of the family living in that place. Unfortunately our modern life is so full of changes that many children do not have a chance to come to love some one spot in a way that makes "home" seem dearer.

However, such conditions are not so true of country life as they are of city life. It is mainly in our larger cities that we find the outside amusements more attractive than crowded rooms. Furthermore, it is easy to overdo this

argument about amusements and unsettled homes. An outside amusement may give a subject for congenial family talk for days. It is as important for the family to have good contacts with the rest of the world as it is for it to have a center of its own. Then, too, even when the *place* called home changes frequently, the family group that tries to do so can still keep its sense of unity and companionship. Every one of us can think of several families that have done so.

Our family life compares favorably with what preceded it.—Sometimes we see what is going on to-day more clearly when we compare it with what has happened in other times and places. Let us compare the kind of family we have now with an earlier form of the family, for, of course, our kind is not the only kind that has ever existed.

Our family has developed out of the patriarchal family. That is the kind of family life described in the Old Testament, and in the histories of Greece, Rome, Japan, and China. Such a family consists not only of the father and mother and children but also of the grown-up sons with their wives and children. All live together in the same house or in adjoining houses. The patriarch, or "Great Father," is the sole source of authority and has full control over all members of the family, and his control is strict and severe. Among many peoples the women were little more than slaves. The father could do as he chose with the children, even to selling them into slavery or killing them. He had complete control of all property. All religious and educational matters centered about him. It was a very stern and arbitrary arrangement.

Although our family has grown out of this patriarchal family, it is different from it in several ways. One difference is that there is no "great patriarch" with whom all the sons live even after they are married. With us, when

two persons marry, they set up a *new* family and a new home. They then run their own affairs. The second difference is that, more and more, our family is becoming democratic. The husband no longer owns the wife; the arrangement between the two is one of partnership and mutual help. There are still some families where the husband doles out money and seems to think the wife is a sort of unpaid servant. But there are fewer such families as the years go by. More and more, husband and wife work together as affectionate equals.

A DEMOCRATIC FAMILY COUNCIL

Our family is democratic in another way: the children are coming more and more to be treated as delightful comrades. This does not mean that there should be no discipline of the children. Quite the contrary. The children should play their part in the family and should be helpful in the family work. But, as one writer puts it, "the modern tendency is for the parents to live *with* the children rather than above them."

The dangers facing family life can be met. — When we make such comparisons with earlier forms of the family, we are encouraged over our present situation. There is no denying, however, that dangers face our family. It is more unstable than we wish it were. As long ago as 1885 there were more divorces in America than in all the rest of the Christian world put together, and divorce has even been increasing with us since then. That is serious. We hope, and most of

us believe, that this state of affairs will change for the better as our living conditions become more settled. As we have seen, the last few generations have been ones of great change and unsettlement in nearly all of our living.

If we were to sum up what we have been saying about the family it might be put thus:

1. There are some real problems ahead of this torchbearer. We wish it were more stable, more aware of its task, and better fitted to do that task.

2. There are social and economic conditions working somewhat against the best family life.

3. We must work at this problem. Some things are already being done, but they are not enough. In particular our education should be of a sort that will help us to see how important the family is and will help us to lead better family lives.

4. We need not be discouraged. Real progress in family life has already been made. The problems facing it in the future can be solved, and *we* can solve them if we will

Since this has been rather a long account of the problems that confront our torchbearers, let us sum up by reminding ourselves that we have been finding out that how well we shall live together depends upon the quality of such important torchbearers as the press, the school, the family, and the church, although we have not taken time to discuss the press and the church in this section.

D. Ideals, the Guides of Communication

(How well we shall live together depends upon whether man, the communicator, is guided by good ideals.)

There can be no doubt that man has greatly multiplied his powers through communication. There can be no doubt that he will multiply them still more in the future. But

greater powers do not necessarily mean better living. Everything depends upon the use made of those powers. How well we shall live together depends upon whether we use our language devices, our systems of communication, and our torchbearers for better living or for evil living.

Everyone knows that is true. The telephone and the telegraph can be used to plan robbery or murder just as readily as they can be used to knit people together. The railroad, the steamship, the automobile, or the airplane can be used to commit a crime or to help a criminal escape as readily as they can be used for good purposes. The press, the school, or the family can be bearers of bad customs and harmful thoughts about as effectively as they can pass on right thinking. Man, the communicator, can communicate evil or good, as he chooses.

On page 205 we saw that good ideals must rule man, the harnesser of nature, if we are really to live together well. So also, good ideals must rule man, the communicator. But we shall hear more of ideals and aspirations in Part V.

Problems

1. Define or explain

Simplified spelling	The "new woman"
Universal languages	Industrial depression
Public utilities	Industrial accident
Freedom of the press	Mother's-pension law
Continuation schools	Minimum-wage law

2. What ideas are in these words: sunshine; justice; friction; smile? Is a dictionary a good place to find what ideas are in words?

3. Watch for some new word in your school work. Write it down. Then watch how you come to know what it means and how you make use of it in your thinking.

4. "The ability to think and to keep in touch with the thoughts of others is highly important in our job of getting a living." Show that Willard Smith (page 337) both gets a living and serves society.

5. Name some ways in which good communication helps us to have good city life. "Our modern cities are possible largely because of modern transportation." Show why.

6. Of the "dreams" on page 342, what ones seem to you likely to come true?

7. What is a private business? Why does society feel justified in supervising a public utility?

8. "Man's ability to harness nature makes us feel that the press will be able to do its work well in the future." Why?

9. What lessons do you draw from the experiences of John Williamson and John Panello? What is meant by vocational courses? By vocational counsel? Does your school offer these?

10. Does it not seem hard-hearted to enforce a law that a child must go to school when the family needs the money the child could earn at work? Is it really hard-hearted?

11. If all children over ten years of age were put to work at once, would the labor power of the country be greater? If this were kept up for fifty years, would the labor power be then greater than it would have been if all the children had been kept in school until they were eighteen?

12. Can you name any position for which you would need at least a high-school education? One for which you would need a college education?

13. Make a list of your duties in connection with making better torch-bearers of our schools.

14. Get from your father a list of reasons why he might become unemployed. Suppose your father should become unemployed. Find out what effect this would be likely to have upon him; upon you.

15. The English system of health insurance arranged for a fund to which workers contributed one third. When a worker became sick, he was given a certain allowance from this fund. Could some such plan be used for unemployment insurance? For accident insurance? How would such plans help family life?

16. Make a list of the different ways it might affect the younger children of the family to have the mother working in a factory.

17. Talk with others and make a list of the ways by which better knowledge of how to care for children is being spread.

18. Show that the new position of woman ought to make her a better torchbearer in the modern family.

19. "One lesson we need to learn is the lesson of thrift. Thrift will mean better family life." Do you agree?

20. What things must a family have to be a good torchbearer? Here is a start: (1) a fair income, (2) well-trained parents. Continue the list.

21. Why should you be careful not to frighten your younger brother or sister by stories of "things that will get them?" Just what are your responsibilities for your younger brother and sister? Make a list of these responsibilities.

22. What is meant by saying that our family life to-day is democratic? Why should you prefer to be a member of a democratic family?

23. Make a list of ways in which communication can be used for evil living. What is the remedy?

24. Answer the questions at the beginning of this chapter, page 333.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter XI.

1. Language Reform (some of the suggestions for simplified spelling, a reformed alphabet, and a universal language).
2. Good Roads (a realm of communication in which we have recently made much progress).
3. The United States Post Office (one way the government aids in developing communication to-day).

See also Chapters VII, VIII, IX, and X.

Problems to think over are given in these reading selections.

PART IV

MAN, THE TEAMWORKER AND COÖPERATOR: SOCIAL ORGANIZATION

PURPOSES OF PART IV

1. To show that good ways of organizing to do things are also multipliers of our powers.
2. To explain what is meant by social organization.
3. To give a view of our main methods of social control.
4. To show the relationship of social organization to living together well.

CHAPTER HEADINGS OF PART IV

CHAPTER XII. The Coöperation of Specialists.

CHAPTER XIII. Finding Our Places and Pulling the Load.

CHAPTER XIV. Social Control: Custom, Law, Public Opinion, and the Sense of Divine Approval.

CHAPTER XV. Social Control: the Nation and Government.

CHAPTER XVI. Social Organization and Living Together Well.

Who would have thought that men could have become such able harnessers of nature and communicators?

What has happened may be put this way. Man had no teeth that would serve him as well as those of the wolf and the tiger serve them. Very well. "He made for himself an artificial tooth. He took a stick and sharpened the end. He hardened this sharp point in the fire, or he inserted a piece of flint." Later, he hurled it by means of the bow. Much later, he put a "tooth" in the gun, and then no animal could compare with him. His arms were not strong. He "extended" his arms with tools and then he multiplied his extended arms a thousandfold by setting the tools in machines and turning on the power.

So, also, man's legs were not as swift as those of the hare or the deer. His swimming was far poorer than that of the fish. Very well. He made for himself artificial legs and fins. These are seen to-day in the automobile, the locomotive, and the power boat. He had no wings, but to-day how powerful are his artificial wings! They carry him across the ocean or the continent. As for his messages, they move with the speed of light when he so wills. And he has language and not mere cries!

In Part IV, we are to read of man as a team-worker in organized society. We are to talk of such matters as competition, private property, social control, government, law, the gain spirit, and coöperation through exchange. These, too, are devices by which man has greatly increased his powers.

CHAPTER XII

THE COÖPERATION OF SPECIALISTS

A. Specialization, Another Multiplier of Powers
B. The Coöperation of Specialists through Authority and through Exchange

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Questions to Keep in Mind while Reading This Chapter

1. Why has man found it worth while to specialize?
2. What are the main forms specialization has taken?
3. How can specialists be knitted together effectively?

Man, the harnesser and communicator, is also a coöperator. — Thus far our story of human progress has shown how man has multiplied his powers in two great realms, or fields, of his activity.

As a harnesser of nature, he has multiplied his puny powers by agriculture; by domesticating animals; by taming the winds to his use; by conquering fire, the metals, steam, and electricity; and especially by becoming a scientist who masters nature by making her obey her own laws.

As a communicator, he has developed methods of keeping in touch with his fellows that seem marvelous. Language, first spoken and later written and printed, has allowed him to store up the wisdom of the ages, to add to it, and to pass it on to later generations. To-day he has access to the wisdom of the past ages and to the wisdom of all present peoples. In addition, he has access to the products of the whole world because of his transportation and trade.

In Part IV, we are to study another great field of man's activity. We are to study him as a teamworker in a social

organization. This study will begin with a sketch of how man organizes to get things with which to live. In this sketch, we shall see that our society is a vast coöperation of specialists, (Chapter XII) in which, by various devices, each of us finds his place and helps pull the load (Chapter XIII). Then we shall see how social control is secured (Chapters XIV and XV) and how social organization helps in living together well (Chapter XVI).

A. Specialization: Another Multiplier of Powers

(The many forms of specialization; its advantages; its newness.)

The main kinds of present-day specialization. — We have grown quite accustomed to living in a society of specialists. It seems quite natural to have doctors and lawyers and teachers and street-car conductors, and what not. It seems

Our Main Producing Regions

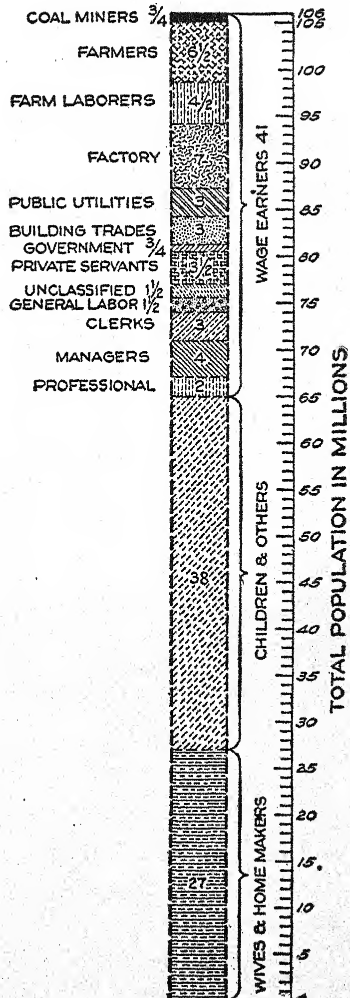
When regions specialize in producing the goods for which they are best fitted and then use the market to exchange these goods for those of other regions, all of us fare better.

equally natural that each of these persons should do just one thing, while others build houses for them, prepare meals for them, make clothing for them, run laundries for them, or amuse them.

Our dependence upon specialists is very great. Our census lists more than 7000 kinds of them, and new ones with new names are created in our bustling world every day. The amount of specialization to-day is so vast that there is no space even to mention the details. We can speak only of its great classes or kinds or groups.

1. *Territorial specialization.*—Everyone would think first of all of our specialization by regions, or territories. That has already been sufficiently discussed (see page 274).

2. *Occupational specialization.*—Then, one would naturally mention our specialization by occupations. Anyone can fill several sheets of paper with the names of different occupations to-day. There are so many of them that it is easier to group them into classes.



Courtesy of S. S. Wyer

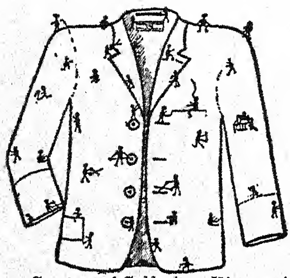
THE OCCUPATIONAL GROUPS IN THE UNITED STATES (IN MILLIONS)

(a) There is one group, or class, of occupations that are "close to nature." That takes in such pursuits as farming, dairying, fishing, lumbering, mining, trapping, and grazing.

(b) There is another group that works on the products of this first group. Here one would list manufacturing, transporting, and marketing.

(c) Still another group is concerned with services rather than with things, and takes in teaching, medicine, law, governing, amusing, and art.

Each of these can be broken up into minor occupations. Take the task of amusing, for example. Can you not easily name a dozen occupations, beginning with acting, whose work is to amuse? Or take manufacturing. Can you not easily name fifty different kinds of manufacturing?



Courtesy of Cubberley: History of Education, (Houghton, Mifflin Company)

THIRTY-NINE SPECIALISTS TO MAKE A COAT

3. *Division of labor.* — Then there is the specialization of workers, or division of labor, that takes place within one of our huge modern business houses. In a shoe factory, for example, we should find that no one works through the entire process of making a shoe. The undertaking is divided into many scores of separate operations, each of which is performed by some worker who does nothing else. We should find in such a factory that:

(a) A "lining stitcher" sews together the different pieces of the lining;

(b) A "closer on" stitches the lining into the shoes;

(c) A "gang-punch operator" punches the holes for the eyelets;

(d) An "eyeleter" puts in the eyelets with a machine;

(e) A "hooker" puts in the hooks with still another machine;

(f) A "heel slugger" drives into the heels a row of brass or steel nails;

(g) A "heel scourer" sandpapers the heel;

(h) A "heel breaster" trims the front of the heel;

(i) An "edge blacker" blacks the edges of the heels;

(j) An "edge setter" hardens this blacking with a block of steel cut to fit the edge and heated by gas.

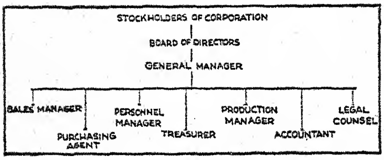
There are separate persons to stamp on the name of the company, to polish the shoes before they are inspected, to inspect them, to put in the laces, to wrap them, to box them, and so on almost indefinitely. Such specialization is not at all unusual. It is found in almost every industry of any considerable size. It is found in office work as well as in the factory.

4. *Specialized capital goods.* — One must not overlook the fact that machinery and buildings are also specialized in the modern plant. Our architects plan or design special buildings for different industries; our engineers design special machines for special uses. For example, in the shoe factory mentioned above, most of these specialized workers used specialized machines. There is specialization of capital goods.

5. *Specialization in management.* — Our businesses have become so large and complex that even the task of managing them has been split up into simpler tasks with specialists in charge. In medieval days, the master craftsman could make the goods, sell the goods, and take care of the whole business.

To-day the general manager of a business has many assistants. The production manager supervises the factory end of the business; the sales manager takes care of advertising and selling; the personnel manager deals with the labor force;

the treasurer watches financial matters; the chief accountant takes care of the records. Each of these managers may have a whole staff of specialists under him. For example, the personnel manager may supervise a medical department, an employing department, a restaurant department, a safety-engineering department, and a miscellaneous-service department. We have specialization of management as truly as we have specialization of workers and of capital goods.



An Organization Chart of a Business

There can be no doubt that one good way of describing our society is to call it a society of specialists.

Specialization is a multiplier of our powers. — There is just as good reason for our great use of specialization as there is for our great use of fire, power, and the metals. Indeed it is the very same reason. It multiplies our powers.

1. *By increasing skill and dexterity.* — Anyone who studies typewriting or takes piano lessons expects to practice. The reason for practicing is that our brains, nerves, and muscles are made in such a way that the repeated doing of a thing increases our ability to do it rapidly and well. "Habit paths" get formed in the brain cells and nerves. As a result, the muscles respond more and more quickly, more and more accurately. This is just as true of play as it is of work. "Practice makes perfect" in making brooms, adding figures, making speeches, running the typewriter, playing baseball, or

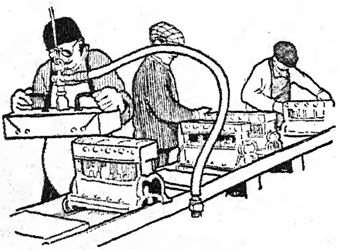
PRACTICE MAKES PERFECT

pitching horseshoes. "Jack of all trades and master of none," is an old saying. It means that if one would be master of anything, he must do it over and over; he must specialize. This specialization multiplies our powers by increasing our skill and dexterity.

2. *By assigning tasks according to talents.* — There is another reason why the group's powers are increased by specialization. Specialization makes it possible for each member of the group to give all his time and energy to doing the things for which he is best fitted. We are all different. No two of us are exactly alike in our bodies, our tastes, our minds, or in any other way. We are "born different," and we become still more unlike as a result of different training and experiences. Each of us should do what he can do best. "It is very wasteful to use an elephant to pull a flea's load and very foolish to use a flea for an elephant's load," runs an old proverb. It would be a mistake to use an Edison to shovel sand; a big powerful man to thread needles; a tiny, weak fellow to unload pig iron; an ignorant laborer to be president; an illiterate blockhead to be a scientist. It would be quite as great a mistake to let the Edisons, scientists, and laborers do the things they can do best in only those brief periods of time that would be left after making their own clothes, cooking their own meals, raising their own food, and all the other thousand and one things of life. Specialization makes it possible for the group to avoid such mistakes, and to use its members "according to their talents."

This gain of specialization is just as true of regions or territories as it is of persons. With his steamships and railroads and other modern means of transportation, man has become able to have regions specialize in producing the goods for which they are best fitted. Everybody is better off, because nature's gifts are thus used to the best advantage (see page 368).

3. *By simplifying tasks.* — There is still another reason why specialization increases the powers of the group. Think of such a complex task as that of putting together the hundreds of parts of an automobile. If one person did the whole job, he would have to be a very capable person who had spent much time studying automobiles. See how this is handled in one plant. The complex job of putting an automobile together has been divided up into hundreds of simple tasks, and those tasks have been "laid out" in their proper order, so that each worker does one little thing over and over again.



ASSEMBLING A MOTOR
THE TASK HAS BEEN SIMPLIFIED

The main framework of the chassis is started on a moving platform. As it moves along, one worker drops a part into place; the next inserts a bolt; the next screws up the nut of the bolt; and so on. At the proper point of the trip, the engine (which has been put together along a route of its own) is dropped into place; so are the wheels, the body, — everything. Finally out the door it goes under its own power, followed by another and another and another every few seconds. The whole complex task has been done, but only a few workers have done complex things requiring much time to learn. Furthermore, workers have been assigned to jobs according to their talents.

4. *Minor advantages.* — Some minor gains are also claimed for specialization. It is said that when tasks are thus divided up and a simple motion is made over and over again, it helps one to see how a machine can do the work and thus causes inventions to be made more frequently. It is also pointed out that different tasks require different tools. If

one man put an entire automobile together, he could use only one tool at a time, and scores of others would lie idle.

There are some disadvantages in specialization, (see Chapter XVI). But it is clear that specialization is just as truly a multiplier of man's powers as is fire or the metals or the steam engine or the printing press or the railroad or the telephone. *Good ways of organizing to do things are just as important as good tools to do them with.*

B. The Coöperation of Specialists through Authority and through Exchange

(How specialists are made into a smoothly working society; the market and those who work in it.)

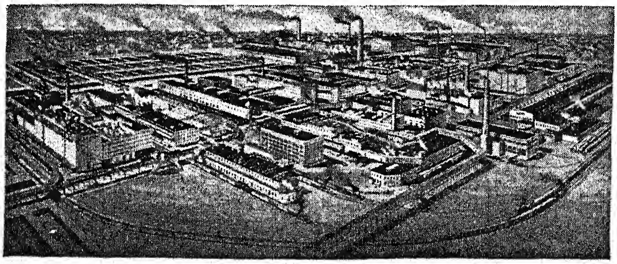
Specialists must be knitted together. — "How we manage to keep the world's work moving fairly smoothly and still have it all done by specialists is little short of a miracle to me," said one writer.

It *is* rather a wonderful thing, when one stops to think of it. Here are thousands of kinds of specialists, each at work on his own task — often a very small and narrow task. How does it happen that, in the main, about the right number of persons is making watches or raising watermelons or sewing buttons on coats? How does it happen that we are not continually facing a great scarcity of some kind of goods or facing a surplus of other kinds? How does it happen that almost any product you or I chance to want is waiting just around the corner for us? How does it happen that, in a large city, day after day and week after week, specialists from all over the world send in about the right amounts of fuel, clothing, food, building material, or drugs to supply that community? It is a rather wonderful thing.

All such questions simply call attention to the fact that if the work of society is to be split up and done by millions

of specialists, there must be some way of knitting these specialists together again into a smoothly running society. There must be some way of keeping their work "in balance," so that they will be doing what society needs to have done. Along with the splitting up there must be knitting together. And there is.

Specialists are knitted together by authority in an army or within a plant.—Thus far, our society has found two main



Courtesy of Swift and Company

BIRD'S-EYE VIEW OF A MODERN PLANT

In such plants specialized machinery and thousands of specialized workers are knitted together into great producing agencies.

ways of knitting specialists together. One way is by commanding them to do what we wish — by the use of authority. That is the way we use in an army. The modern army is really a collection of specialists: infantrymen, cavalrymen, artillerymen, truck drivers, medical men, cooks, mechanics, machine gunners, paymasters, roadmakers — literally hundreds of different kinds of specialists. Everyone knows how they are knitted together into a good fighting machine. They are knitted together by authority. They obey the commands of the officers. These commands are given in accord with plans previously worked out, and everything usually goes smoothly.

We use this same scheme within the walls of our business houses. Take the putting together of automobiles. This

work is all planned, so that the different parts come together in the right quantities, at the right time, and in the right place, much as branches flow into rivers. The management of the firm places the right men at the right places and tells them the right things to do. The plant is knitted together by authority.

It is possible to knit the specialists of a whole society together by authority. — But while we frequently use authority to knit together our specialists after they enter the army or an automobile factory or a government office or any of our plants of to-day, that tells a very small part of the story. How do we settle how many shall go into the army, as compared with how many shall make automobiles, as compared with how many shall make the other goods we wish? Do we use authority? We could do so, and we have done so in times of great emergency. In the World War, we "drafted" (ordered) men into the army; arranged for some to stay out of the army and build ships; told others to help run the railroads.

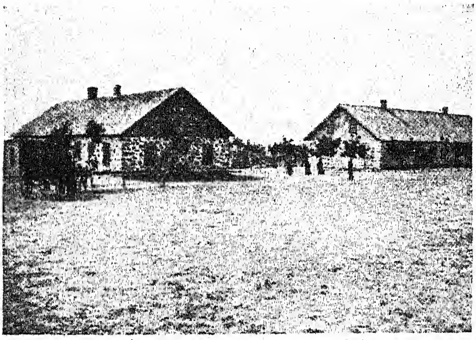
Authority could thus be used even in normal times. There are, indeed, a few small groups that do use that method. Here is the way one of these American groups runs its affairs.[1]

The use of authority illustrated in one communistic group. — About one hundred and twenty persons, believing that goods should be owned "in common" rather than by individuals, live on some 7500 acres of land in one of our western states. They choose for themselves two leaders or officers who manage the affairs of the community. One of them, the preacher, handles the religious work. The other, the Wirt, manages and directs the rest of the community work. The Wirt has under him such helpers as the farm boss, the head

[1]Bertha Clark, "The Huterian Communities," *Journal of Political Economy*. The original text is followed in part.

miller, the carpenter, the blacksmith, the shoemaker, the head cook, and so on. He hands out to them the supplies they need and receives from them the product of the work done by their groups. He is the general manager who plans the work and sees that the plans are carried out.

The day starts early. The first hour sees one group milking, another feeding the stock, another cooking the breakfast, another putting the sleeping rooms in order. After breakfast, the squads are changed, and each goes to the work of the day. The men of skilled trades go to the little shops where most of the manufactured goods used by the community are made. The farm hands go to the fields. The children go to school. The women go to household duties and to the gardens.



THE COMMUNITY LIVING QUARTERS

All things owned in common. — Everything that is raised or made belongs to the whole community. Food and clothing are kept in community storehouses and used as needed. There are no separate kitchens in the various houses. Instead, there is a community kitchen and a community dining hall where all get exactly the same simple fare. Even the household furniture of the families belongs to the whole community, as does also the clothing a person wears. Children do not inherit goods from their parents. The goods formerly used by a person who dies are taken up and handed out to others as needed.

It is quite clear that these people have a scheme of working together coöperatively. It is based on community property and community direction. Each member of the community gives himself entirely to the group. He works under the general and kindly direction of officials he helps to choose. Everything he makes or raises belongs to the group. There is a community laundry, community barn, community bakery, community granary, community mill, community broom shop, community cellar, community creamery; there are community chicken coops, community beehives; community everything, absolutely everything.

THE SIMPLE COSTUMES OF THE WOMEN

The individual has nothing but his own family life and his own thoughts. Even these are so largely set by customs handed down through centuries that in some real sense they are community affairs also. On the other hand, the individual is not oppressed. Quite the contrary. Out of the group storehouses he is clothed; in the group dining room he is fed; in case of sickness or accident he is cared for. Everyone is supposed to work faithfully and well; in return he or she lives as well as any other person in the group, even if the living is simple.

Communistic experiments usually short-lived. — This way of organizing to live together has always seemed attractive to some small groups of persons, and it certainly is one way of getting the task done. It must be said, however, that few such ventures have been long-lived. When they have

lasted some time (the one described started back in the sixteenth century in Europe), it has usually been because they have been held together by the powerful ties of some strong religious belief. One of the elders of the group we have described explained why they had held together and had kept their property in common thus: "Of course, we feel the temptation to work each for his own interest. Everyone does. But we cannot feel that it would be right to yield to it." It does not matter to them that others think differently about it. They are firm in their own faith. They hold to a simple life; they refuse to yield to the "temptation of having each work for his own interest."

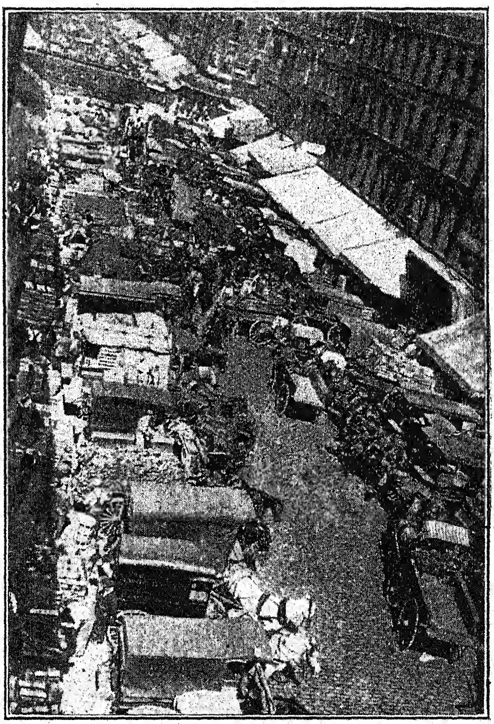
Our individuals knit themselves together through exchange. — This story of a communistic society shows that the specialists of a whole group *can* be knitted together through authority. But in the main, such methods have not lasted and have not made for progress. Instead of that way, we use a scheme in which society merely lays down certain broad, general "rules of the game." *Then it lets its individuals take the lead and knit themselves together.* They do this by exchanging goods with one another; by using "the market." This exchange by individuals is the second great way of knitting together the specialists of our society. It is the way we have come to use most.

Feeding a city illustrates the knitting together of specialists. — As one small sample of how the specialists of our society are knitted together by means of the market, let us look at the way a city is fed.

The produce market of a city.[1] — There is a street in the city of Chicago that is only a few blocks long — South Water Street it is called. It is one of the busiest streets of the world,

[1]Adapted from Lesson B-4, *Lessons in Community and National Life.* The original phraseology is followed in part.

for here much of the perishable produce that Chicago needs is handled. It is the great wholesale market of this produce. This produce comes into Chicago by the truckload, the carload, and the shipload, a steady stream. It comes by truck from near-by farms; it comes in special refrigerator cars across the continent; it comes by boat from the fruit belt of Michigan. By daylight in the summer months, and even before daylight in the winter, the street begins to be busy. The short, narrow street is packed with thousands of wagons and trucks that are bringing in their loads to the sales place, or are carrying them out to the hundreds of retail stores throughout the city. Even the sidewalks are so filled with the produce for the day's sales that in places buyers must move in single file.



SOUTH WATER STREET IN THE DAYS OF THE HORSE-DRAWN WAGON

The warehouses. — There are scores of warehouses. Each warehouse is likely to specialize in some particular class of

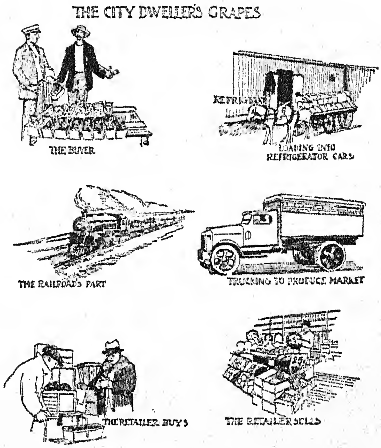
products. Here is one devoted entirely to trading in cheese. There is a four-story building filled with Spanish and Bermuda onions. Yonder are three warehouses with hundreds of bags of potatoes piled from floor to ceiling. Here is a group the cellars of which are full of ripening bananas from Central America and pineapples from Porto Rico. There is another group almost bursting with citrus fruits from Florida and California. Yonder are several handling only fresh vegetables. These are fitted up with special devices for keeping vegetables fresh and for improving the condition of those injured during their travels. Shallow tanks of cold running water freshen asparagus from California or spinach from Texas or lettuce from Florida, California, or New York.

The cold-storage warehouses are a tribute to the skill of man, the harnesser of nature. In them he has tamed the climate and adjusted it so that he may store for considerable periods of time such products as cheese, butter, poultry, eggs, apples, and potatoes. These products are collected during the seasons of the year when they are most abundant and stored for use in seasons of less abundance.

Produce dealers are agents in knitting together producers and consumers.—We cannot stop to describe all the dealers who work in this huge market, but we must look at a few of them. There is the *buyer* who is sent out by South Water Street firms to purchase goods. He goes through a producing territory, making contracts with producers for all or for part of their output, or buying from day to day wherever he can secure goods at satisfactory prices. He keeps in close touch with his employer, advising him by letter, telegraph, or telephone of the outlook as to quantity, quality, prices demanded, and competition from other buyers. In turn, he is told about the situation in the Chicago market, and is instructed how much to buy and what to pay. The buyer ships his pur-

chases, by means of the transportation companies, to his employer, the South Water Street produce merchant.

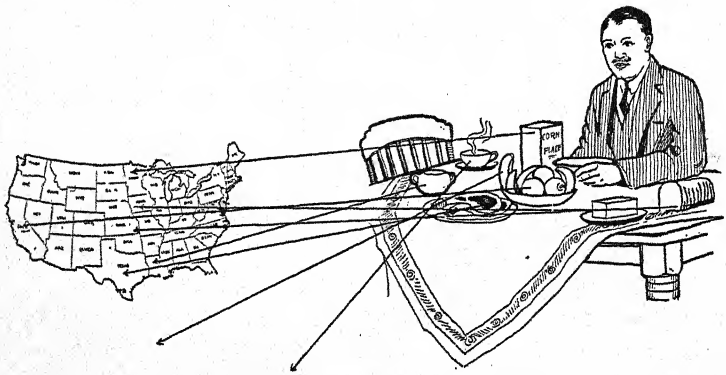
Not all goods come into the market as a result of the work of these buyers. Sometimes groups of producers organize themselves into *coöperatives* and have an agent to sell their produce. Sometimes producers combine their shipments and send them in carload, or even train-load lots, and have them sold at public *auction*, usually at railroad freight yards or at steamship piers. Fruits are especially likely to be handled this way. Sometimes producers ship direct to *commission men* in South Water Street who sell for them and charge a commission. It is clear that there are many possible channels for supplying the food of the city.



SOME AGENCIES USED IN SUPPLYING FRUIT

The wholesale grocer also works at the knitting together process. — The part played by the wholesale grocer is another important piece of service. He deals in commodities of a less perishable nature. He also, like the produce merchant, has his buyers out in the producing regions, even in those of far-distant countries. He imports tea from Japan and China; coffee from Brazil, Colombia, Java, and Arabia; cane sugar from the West Indies and from Hawaii; olives from Spain and Italy. The fig trees of Turkey, the terraced rice fields of China, and the date palms of Persia supplement the food products gathered from the farms, orchards, pastures, and streams of our own country.

Much of this material, after it comes to the wholesale grocer, must be specially prepared before it is ready to be put into the hands of the retailer. For this purpose special machinery may be used, such as large mills for grinding spices, machines for cleaning the coffee, ovens for roasting it, and machines for measuring it into the packages demanded by the retail trade. Olives arrive in large hogsheads. They are washed

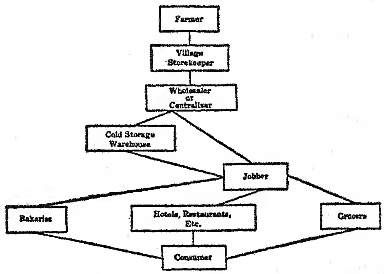


THE WESTERN HEMISPHERE SUPPLIES HIS BREAKFAST

and bottled in brine, or the stones are removed and the olives filled with pimentos from Mexico. Brazilian nuts come in a very rough condition; they are polished in rotating cylinders.

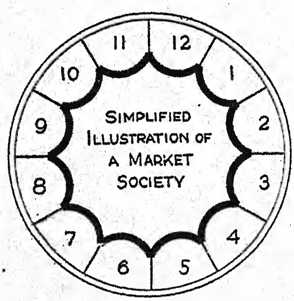
All such work the wholesale grocer needs to stand ready to do, although some of it to-day is taken over by the producers, or by specialists in packing. This work done, the wholesale grocer must store in warehouses until the goods are demanded, deliver in trucks to the retailer, give credit to the retailer, help the retailer advertise certain goods, and even give him suggestions about how to keep his accounts. The retailer looks upon the wholesaler as the great reservoir of goods, from which supplies can be secured as needed.

Others who help feed a city. — Now all this is but the beginning of the story of the feeding of a city. There remains the story of flour and the bakeries; the story of the restaurants and hotels and boarding houses and homes; the story of the provision merchants who deal in meats and meat products; the story of the retail grocers and delicatessen men. However, these stories are all fairly well known; they do not need to be told here. The feeding of the city shows that ways have been found to knit together the specialists of the city with the specialists of all the rest of the world. It is done through "the market," through exchange.



Some Specialists Who Help Get Eggs to the Consumer

A simple illustration shows the work of the market.—The way the specialists of our cities are knitted together with those of the rest of the world is typical of the way it is done throughout our society. This may be shown by a simple illustration. If our society were a small group of twelve, and if there were only a dozen goods and services in the world, we could easily picture the situation to our minds. It would be as if there were a dozen booths in which the goods and services were made, opening out into a market place. On the counter running around in front of the booths the goods could be displayed. Each of the specialists would sell his own wares and with the money he would buy such other wares as

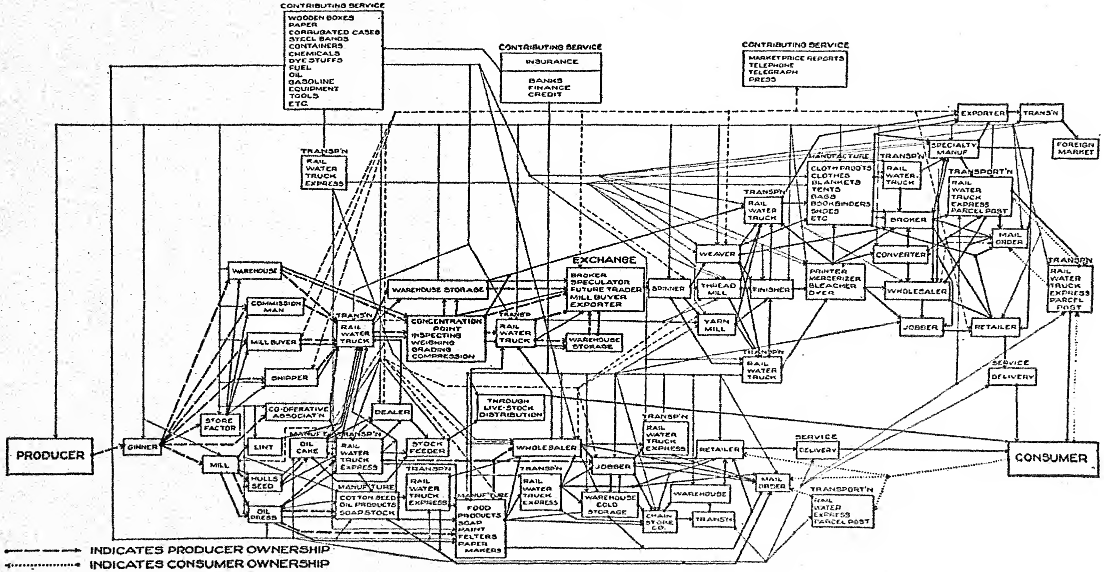


he chose. The twelve, working as specialists, could make far more than they could have made as jacks-of-all-twelve-trades. They would coöperate with one another (be knitted together) through exchange.

This simple illustration shows the main features of what is done in our real society. In our real society, there are more than 100,000,000 persons in the United States alone, and these coöperate not only with one another but with people of other nations. We have thousands and thousands of different kinds of goods and services. Many of these goods are made by thousands of persons working in giant factories scattered all over the world. No tiny booth arrangement around a little market place would serve to knit all this together. But if we use the word *market* to mean all the billions of exchanges that go on every day in these tens of thousands of goods and services, we see that the specialists of our society are knitted together by these exchanges in the market just as truly as the imaginary twelve were by using the tiny booths.

Middlemen do much of our marketing work.—When we think of the market in that way, we realize that it is so huge and its work is so enormous that specialists must arise to do some of this marketing work. We have them in hordes. Merchants, commission men, wholesalers, retailers, department stores, specialty stores, mail-order houses, traveling salesmen, advertising agencies, produce merchants, hucksters, and peddlers are a few of the many we all know. We should include in this list of persons who work in the market, those who work in our banks, railroads, steamships, insurance companies, and warehouses. Specialization has been carried as far in the market as it has in other parts of our living together.

We have come to call these persons who work in "the market" for us *middlemen*. In the old days, when each person



How Cotton Reaches the Consumer

The cotton is produced in our southern states. It goes to the cotton gin, and then the fiber and the seeds are split up into dozens of products. These pass through the hands of scores of buyers and sellers who are aided in their work by specialists who transport, insure, finance, store, and communicate. When we reflect that this diagram has been made very simple, and that similiar diagrams can be made for other products we use, we see that the market that knits us together is a very complex and wonderful thing.

made or raised practically all the things he used, there were, of course, no middlemen. The producer was also the consumer; they were one and the same person. That state of affairs may be illustrated by this diagram: | In the old days Producer = Consumer |

Later (let us say in the medieval towns) the producer made goods himself and sold them direct to the consumer. On pages 131 and 132, that way of doing things is described. It may be illustrated by this diagram: | Producer | Consumer | Still later (to-day, let us say) everyone has become a specialist. Specialists working in the market are the go-betweens, or middlemen, of the specialized producers and the consumers. This diagram illustrates that way of doing things:

Millions of specialized PRODUCERS sell goods through	hosts of specialized MIDDLEMEN who pass the goods on to	the millions of CONSUMERS, who are themselves specialized producers of other goods

We rely mainly upon individual initiative in this knitting together through exchange. — As was said earlier, the community, as a whole, merely lays down the general rules of the game in our knitting together of specialists. How it does this is to be explained more fully in Chapter XIV. But we already know the main outlines of the story. We know that there is such a thing as government; that there are laws saying individuals may do some things and may not do others and may do still others only under certain conditions. For example, individuals may not steal or damage one another's property; they may engage freely in ordinary businesses; they may become doctors only if they pass the state medical examination, or restaurant keepers only if they pay the license fees. In addition to using law, the community also

uses public opinion and custom in laying down rules of the game to control the individual.

Then the community says to its individuals: "Now, act according to these general rules and *specialize*, for by specialization your powers will be greatly increased. Then *exchange* with one another the goods and services you make. If necessary, let some of your number specialize in running this exchanging, — in being *middlemen*. Since money is the language of trade, use *money* in your exchanging. Those of you who are wise enough, or fortunate enough, to make goods greatly in demand by others, will 'make money.' Those of you who are unwise or unfortunate enough to make goods that are not demanded will 'lose money.' Since everybody will wish to 'make money' so that he can buy from others the things he wishes, you will all be anxious to *make what the community demands*. That is the way we shall get the 'right' quantities made and have our living go on smoothly."

That is how, in our society, our specialists are knitted together: how they coöperate. It is left mainly to the individual. Individuals, rather than the community, work out the knitting together. They take the lead (we say they take the initiative) and they knit themselves together, or coöperate, through exchange. We call this a scheme of "individual initiative," meaning that individuals take the leadership in acting.

Summary view of the coöperation of specialists.—The results of our study of man, the coöperating specialist, may be summed up thus:

1. Specialization is a multiplier of our powers. Ways of organizing to do things are as important as tools with which to do them.

2. Specialists must be knitted together. This may be done by authority or through exchange. We use both

methods. The main use of authority takes place within plants. Exchange is so widely used that our society is properly called an exchange or market society.

3. The leadership or initiative in this knitting together through exchange is taken by the individual. Society lays down general rules of the game.

4. Although specialization is a very old device, its great development has taken place in the last one hundred and fifty years. The reason is simple enough. Only in the last one hundred and fifty years has man been a great harnesser of nature, a scientific planner, and a great communicator. He had to be all these if he was to be a great specialist. Not until he was making many different goods with many tools could there be the 7000 different tasks listed in our census volumes. Not until he had become a fairly scientific planner would he be able to split complex jobs into their specialized parts. Not until he had become a good communicator could he have the transportation devices that would let him carry goods from specialized producers to consumers all over the world. That is why the great special-

SPECIALISTS OF 1415 IN ENGLAND

Woolen weavers; plasterers; armorers; parchment makers and bookbinders; chandlers; spurriers; lorimers; barbers; curriers; pouchmakers; bottlers and capmakers; littisters; tilemakers; millers; furriers; harvesters; bowlers; winedrawers; drapers; linenweavers; innkeepers; vintners; ironmongers; spinners and vestmakers; bowyers and fletchers; cooks and watercarriers; shearmen; carpenters; brokers and wool packers; mercers; fullers; shipwrights; spicers; perterers and founders; masons; cutlers; bladesmiths; painters; scriveners; illuminators; pardoners; dubbers; tanners; coppers; fishmongers; mariners; tilers; marshals; girdlers; nailers and sawyers; smiths; plumbers and patternmakers; bakers; cordwainers; tapestry makers and couchers; butchers and poultry dealers; saddlers, glaziers, and joiners; tailors; potters.

As complete a list of the specialists of to-day would fill twenty pages of this book.

ization of to-day has occurred so recently that the change is in the memory of persons still living.

5. Since we have reason to expect in the future still greater development of man's powers as a harnesser of nature and communicator, we may reasonably expect a further increase of specialization.

6. There are evils and disadvantages in specialization, but that is a story to be told later.

7. And we must never forget that the story of our coöperating specialists is a part of the story of living together in organized society. Other parts of that story are to be told in later chapters.

Problems

1. Define or explain

Specialist	Knitting together by exchange
Specialization in management	Coöperation of specialists
Territorial specialization	Communism
Division of labor	Middlemen
Knitting together by authority	The market

2. Make a list of persons who are quite highly specialized workers. Make a list of some who are not very specialized. Can you make a list of absolutely unspecialized persons to-day? Can you think of anyone to-day who engages in every kind of work necessary to produce all the commodities he uses? Compare your lists with those of other students.

3. Suppose that John Jones is the best lawyer in the state as well as the best stenographer. Should Jones do his own stenographic work or should he hire a stenographer? Show that your answer illustrates one of the gains of specialization.

4. Bananas can be raised in hothouses in Canada. Would Canada be wise to get her supply of bananas that way? Show that your answer illustrates one of the gains of specialization.

5. Specialization is partly responsible for the fact that women are doing more and more work outside the home. Why?

6. "The housewife to-day must be a specialist in buying." Is that true? What courses in the school curriculum would be helpful in preparing girls to be skillful purchasers?

7. Is there specialization of regions or territories in your town? Is there a "business district"? Are there other districts?

8. Name three goods which could be produced in your neighborhood or region, but which you get more cheaply by buying from people in other districts (see question 3 on page 298).

9. Work out an organization chart of the public schoo system of your city. Is there specialization of tasks? Pick out illustrations of specialization in your own school.

10. Are the grocer's delivery men among the coöperators who provide us with a loaf of bread? Are the men who work at paving streets? Are the people who pay taxes? Is the policeman?

11. "Each person or community tends to gain whenever any other person or community increases its powers." Explain why this is true.

12. "All labor is noble." "Every calling is sacred." Prove that a farmer raising potatoes in Michigan may be coöperating in missionary work in India.

13. Make a list of the reasons for calling specialization a multiplier of our powers. Make a list of its main forms.

14. Give five illustrations of knitting specialists together by authority.

15. Show that in the communistic group discussed on pages 377-380 there was an organized way of doing things. Show that the people coöperated.

16. "In communism there is likely to be a lack of progress because no one fares any better than others if he happens to be especially able or capable." Do you agree?

17. Make a list of as many agencies as you can that are *directly* concerned with providing a city's food supply. Name ten other agencies that help this first list of agencies and are therefore *indirectly* concerned with providing a city's food.

18. How can city people who work all day making automobile parts, or running street cars, or copying figures on adding machines know that some farmer will produce butter and eggs for them?

19. How do the people of a city help to satisfy the wants of the various persons who send them food?

20. Try to trace some ordinary commodity of to-day, such as a loaf of bread or a bottle of milk, through the work of all the different persons who had a hand in producing it.

21. "Commerce does not increase the wealth of the nation since it only transfers goods from one person to another. Time and energy are spent merely in passing things on." Is this true?

22. "The fact that producer and consumer can be thousands of miles apart results from man's ability to harness nature and to communicate." Show that this is true.

23. What is a wholesale market? A retail market? Is a grocery store a market? Is a factory that hires labor a market? Is a bank that lends money a market?

24. Our society is often spoken of as "a market society." Show why this is a good description.

25. Answer the questions at the beginning of this chapter, page 367.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter XII.

1. Colonial Cloth Making and a Modern Factory (an example of the growth of specialization).
2. Canning Corn (an example of specialists working to supply our food).
3. Linking Country and City (the marketing of wheat as an illustration of linking country and city).
4. Modern Storage (one of the specialized tasks in the marketing work of society).

See also:

Chapter II, 2. Woman's Share in Primitive Culture (early division of labor).

Chapter IX, 1. Early Fairs and Markets (the main trading places of the days of small trade).

Chapter XIII, 1. The Social Life and Industries of Ants (division of labor and place finding governed by instinct).

Chapter XIII, 3. Woman's Place in Modern Culture (the tasks and opportunities of woman in our society).

Chapter XVI, 1. Improving Our Market Machinery (one example of how we improve the knitting together of our specialists).

Problems to think over are given in these reading selections.

CHAPTER XIII

FINDING OUR PLACES AND PULLING THE LOAD

A. Groups with Few Place-finding Problems
B. Place Finding in Our Society
C. Individual Initiative, a Multiplier of Our Powers

Questions to Keep in Mind while Reading This Chapter

1. How can one find his proper task or place in a society of specialists?
2. How can one know what use to make of his property in such a society?
3. What motives ought to govern one in placing himself and his property?
4. Just how is individual initiative a multiplier of our powers?

The last chapter revealed us as a society of thousands and thousands of specialists, each working at a single task and yet all knitted together. We are knitted together mainly by the market, although authority is also used. There can be no doubt that this plan of a society, this scheme of social organization, works fairly well. We have made a good deal of progress under it. But where do you and I fit into the picture? How is it settled what our particular task is to be? The purpose of this present chapter is to show that there are answers to such questions.

A. Groups with Few Place-finding Problems

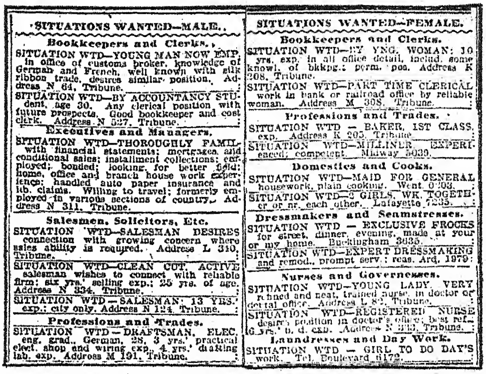
(Place finding in an unspecialized society and under a caste system.)

Let us first look at two societies where the problem of finding the "right" place for each individual is handled in a way quite different from the way we have come to use.

No place-finding problem in an unspecialized society. — In the time of neolithic man, there was no problem of finding one's place in society. The Iroquois girl did not need to ask herself whether it would be best for her to be a teacher, a secretary, a clerk, or a doctor. The Iroquois boy did not need to ask whether he should be a lawyer, a mechanic, a preacher, or a dentist. There were no such occupations. There was only one occupation: that of just living along in the gens. Or perhaps we should say there were two occupations:

(1) that of being a woman in the gens, and

(2) that of being a man in the gens. The woman would till the soil, prepare the food, take care of the children, and make the household utensils. Why? It was the custom. The man would be the hunter, the fisherman, and the warrior. It was the custom. Each and every woman did all parts of the "woman's work"; each and every man did all parts of the "man's work."



SITUATIONS WANTED—MALE.

Bookkeepers and Clerks.

SITUATION WTD—YOUNG MAN NOW EMP. in office of customs broker, knowledge of German and French, well known with silk ribbon trade, desires similar position. Address N 64, Tribune.

SITUATION WTD—BY ACCOUNTANCY STUdent, age 30. Any clerical position with future prospects. Good bookkeeper and cost clerk. Address N 527, Tribune.

Executives and Managers.

SITUATION WTD—THOROUGHLY FAMIL- with financial statements; mortgages and conditional sales; installment collections; employed; bonded; looking for better field; home, office and branch house work experience; handled auto paper insurance and lib. claims. Willing to travel; formerly employed in various sections of country. Address N 311, Tribune.

Salesmen, Solicitors, Etc.

SITUATION WTD—SALESMAN DESIRES connection with growing concern where sales ability is required. Address L 310, Tribune.

SITUATION WTD—CLEAN CUT, ACTIVE salesman wishes to connect with reliable firm; six yrs.' selling exp.; 25 yrs. of age. Address N 334, Tribune.

SITUATION WTD—SALESMAN; 13 YRS.' exp.; city only. Address N 124, Tribune.

Professions and Trades.

SITUATION WTD—DRAFTSMAN, ELEC. eng. grad., German, 28, 3 yrs.' practical elect. shop and wiring exp., 4 yrs.' drafting lab. exp. Address M 191, Tribune.

SITUATIONS WANTED—FEMALE.

Bookkeepers and Clerks.

SITUATION WTD—BY YNG. WOMAN; 10 yrs. exp. in all office detail, includ. some knowl. of bkkpg.; perm. pos. Address K 208, Tribune.

SITUATION WTD—PART TIME CLERICAL work in bank or railroad office by reliable woman. Address M 308, Tribune.

Professions and Trades.

SITUATION WTD — BAKER, 1ST CLASS, exp. Address K 203, Tribune.

SITUATION WTD—MILLINER, EXPERIenced; competent. Midway 5039.

Domestics and Cooks.

SITUATION WTD—MAID FOR GENERAL housework, plain cooking. Went. [illegible]

SITUATION WTD—2 GIRLS, WK. TOGETHer or nr. each other. Lafayette 7235.

Dressmakers and Seamstresses.

SITUATION WTD — EXCLUSIVE FROCKS for street, dinner, evening, made at your or my home. Buckingham 3835.

SITUATION WTD—EXPERT DRESSMAKING and remod., prompt serv.; reas. Ard. 1979.

Nurses and Governesses.

SITUATION WTD—YOUNG LADY, VERY refined and neat, trained nurse, in doctor or dental office. Address L 82, Tribune.

SITUATION WTD—REGISTERED NURSE desires position in doctor's office; best ref.; 6 yrs.' o. d. exp. Address N [illegible], Tribune.

Laundresses and Day Work.

SITUATION WTD — GIRL TO DO DAY'S work. Tel. Boulevard 6172.

SUCH ADVERTISING WOULD BE UNTHINKABLE IN AN UNSPECIALIZED SOCIETY

This meant that when a child grew up, he did not "look for a job." There were no "jobs." All there was for him to do was to go on living as the gens had always lived.

The caste system as a place-finding device.[1] — In an unspecialized society, then, there are no place-finding problems. All its members work and live alike. Let us now look at a

[1]Adapted from Lesson A-16, *Lessons in Community and National Life.*

society that is somewhat specialized, but has a scheme of social organization resulting in its having few place-finding problems. That is the case under the caste system. The caste system is a scheme of social organization in which people have come to be divided into classes in a very sharp and rigid way.

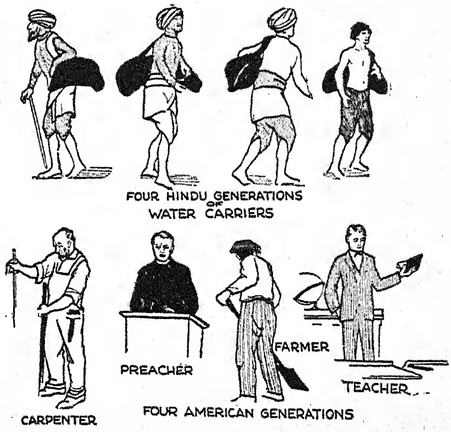
Many, many generations ago, a horde of invaders (they were members of the Aryan race) poured down from Central Asia, through the mountain passes, and into the plains of India. The three main occupations of these Aryan invaders were the work of the priests, or Brahmans; the work of the soldiers, or fighters; and the work of the farmers. They made slaves or laborers of the dark-skinned peoples they found on the plains. These became a fourth group, — a despised group called the Sudras. This happened at a time when these peoples were very much ruled by custom. As the generations went by, there came to be four quite distinct classes or castes of the population. Gradually these four groups split up into many others. To-day there are about 2500 of these classes or castes.

The rigid rule of a caste system. — One very interesting thing about this caste system is the fact that birth determines for all one's life in what caste one belongs. In whatever caste he is born, there he must stay. He can never rise out of it. Neither can his children, for marriages must occur within caste bounds.

It is hard for us to realize what a rigid matter caste has become in India. We have nothing like it. Caste rules govern every detail of the Hindu's life from the cradle to the burning ghat that reduces his body to ashes. The morning bath, the cooking of food, the cleansing of utensils, the forms of worship, the shape of the turban, the style of clothing — everything is done according to caste rules.

What one shall work at is mainly fixed by caste, since nearly all the vocations are organized on caste lines. For example, there is a tailor caste, a goldsmith caste, a washerwoman caste, a barber caste, a potter caste, a sweeper caste, and so on.

It is not merely the custom to do everything according to caste rules; it has become part of the Hindus' religion. They believe that their gods have commanded that all human life shall be governed by caste. Since they are one of the most religious peoples in the world, the grip of caste is strong upon them.



Place Finding in America Is Not Ruled by Caste

A caste system prevents good coöperation. — Perhaps the worst aspect of this caste system is the way it checks the widening of sympathy and the desire to serve others. In general, a high-caste person must have as little as possible to do with a low-caste, or with a foreigner. He is forbidden to touch, or be touched by, even the shadow of the low-caste, who is regarded as unclean or untouchable.

The low-caste man is handicapped at every step of life. The mail carrier will throw his letter on the ground; the high-caste judge will not let him in a court room. He must crowd to the side of the street as the high-caste man passes by. He cannot get a drink of water from the public well. When pestilence sweeps through his village, he is left to die

at the roadside, untouched by the high-caste passer-by. We can picture what this means in India, when we remember that there are about 60,000,000 of the untouchables, and their numbers are rapidly increasing. Among others, they include the small farmers, the weavers, the shoemakers, the tanners, and the sweepers.

Since the foreigner, too, is considered unclean, it is not easy for the Hindu to have a feeling of sympathy and co-operation with the people of other nations. A boy from Ohio was one day walking through the narrow crowded streets of a city in India. He decided to buy some native sweets at one of the little open shops. The shopkeeper was clearly not anxious to sell to him. Instead of handing him the parcel of candy, he put it on the mud floor. When the boy offered the money, the shopkeeper drew back quickly, and motioned the boy to leave the money on the floor where the parcel had been. He would have broken his caste and become polluted if he had given the parcel into the boy's hands or taken money from him. According to caste rules, one must not have direct dealings with a foreigner.

Summary of the results of a caste system. — From this account of the caste system of India, we see several things:

1. Ways of doing things that seem very repulsive to us, seem quite natural (and indeed the only proper ways) to others who have been trained differently. The caste system seems right to the Hindu. It is, he thinks, the way of the gods. A child born in a sweeper's family is placed there because of evil done in some former life. A child born in a Brahman's family is placed there by higher powers because of good done in an earlier existence. A high-caste man can thus feel that his favored position has been earned: — earned in an earlier existence. It seems as right to the Hindu that

birth should determine the whole life of a person as it seems wrong to us.

2. Whether right or wrong, a caste system is surely one way to organize a society. It settles, by the accident of birth, what part everyone shall play in society; what he shall work at; how he shall deal with others; how he shall think about others; how he shall take care of most of the little details of life, including even the style of his clothing.

> **UNTOUCHABLE CLASS.**
>
> **Grand Assembly of Hindus Unanimously Lifts Ban.**
>
> The Hindu Maha Subha (Grand Assembly of the Hindus), which held its seventh annual session in Benares recently, attended by about 6,000 delegates from all parts of the country, after a heated discussion passed unanimously a resolution removing the ban against the "untouchables" with regard to schools, public wells, meeting places and temples.
>
> This result was mainly brought about by the tact and willingness to compromise displayed by the leaders of the reform party, particularly Pandit Malaviya, in overcoming the opposition of the orthodox section. Pandit Malaviya in the course of his presidential address, describing the miserable condition of the "untouchables," and their oppression by the higher castes, said:
>
> "We regard ourselves as polluted by the touch of the very shadow of any one of the depressed classes, and we refuse them the privilege of leading a healthy, decent, civilized life,

3. The caste system of India has become so rigid through custom, race prejudice, and religious prejudice that there is a terrible hopelessness about the system. The low-caste cannot rise: it is thought wrong even to wish to rise. It is believed that the gods have put him where he is, that they will be angry if he even thinks of escaping. This keeps the individual from striving to improve his condition, and there is little chance for progress without that striving. The caste system, in other words, checks the individual from taking the leadership or initiative. It keeps the individual, and especially the low-caste man, from being active and aggressive. It must be said, however, that the system does not absolutely prevent change. Indeed, changes are occurring at this very time.

4. A caste system checks the growth of sympathy and the love of serving others. It is true that it promotes these feelings within the caste but it tends to confine them to one's own caste, or at least to a narrow range of castes. The result is, a society organized on this plan can hardly be fully

coöperative; can hardly get the spirit of "all pull together." Now, coöperation is a real multiplier of our powers. It follows that the caste system tends to prevent the group from rising to its full powers, — to its full capacities. Such a group does not live together as well as it should.

We in America do well to oppose anything tending to develop a sharp class, or caste, system.

B. Place Finding in Our Society

(The promptings of the gain spirit; social regulation; personal tastes; the desire to serve.)

The account we have just had of persons finding their places in two other societies does not tempt us to try such methods for ourselves. We should not wish to be members of an unspecialized society, for we should be sorry to lose that multiplier of our powers, specialization. We should not wish to be members of a caste system, for in such a system coöperation is not well developed, and the group does not live as well as it should. Let us now see how place finding is handled in our own society.

Individuals follow the gain spirit in placing themselves. — Our own society is so complex that it is not easy to describe the plan we follow in finding our places. We do it, in large part, by following the promptings of the gain spirit, but what does that mean? Let us notice several cases. In my mail this morning, I find four letters. Here are extracts from two of them. The other two will be noticed later (see page 408). Number one says:

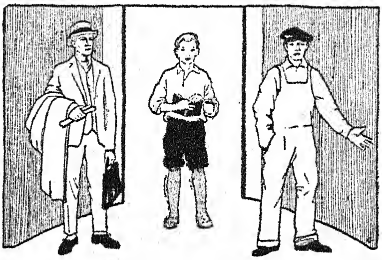
> I have been teaching school for five years. I like the work very much, but the salary is not enough for the modest needs of my family. I have been wondering whether it would be wise for me to become an accountant. If I do so, what salary might I reasonably expect? How much would it cost to prepare for this new work?

Number two says:

I shall be graduated from high school this June, and I really do not know what to do next. My father is a lawyer. He advises me not to take up law. He says there are too many in that profession already.

I think I should like to study either engineering or business. Can you tell me where I can find something to read about these tasks? I should like to know what the work is like; what the pay is; and what it costs to learn each.

These letters are not unusual. They put down in black and white questions that are in the minds of millions of us. "What work is society paying well for these days? What will it cost to prepare for that work? How can I find out *what pays best?*" Those last three words tell the story. We do, or try to do, what pays best. Sometimes our information is poor; often we make mistakes and must try something else. But we follow the promptings of the gain spirit, to a very great extent.



SHALL HE CHOOSE A PROFESSION OR A TRADE?

Property also is placed according to the promptings of the gain spirit. — In addition to placing ourselves, there is also a need of getting private property into tasks or places where it serves. As we know, private property means that private persons own land and buildings and machinery and what not, instead of their being owned by the group. The person who owns property can either lend it to others or he can use it himself in business. If he uses it himself, it enables him to rent land, hire workers, buy machinery and raw materials, and, in general, to manage and operate the business. If he makes a profit, he keeps that profit. If he makes a loss, he loses some of his property. Naturally, he tries to

get into a business for which society has a demand, hoping thus to make profits. He follows the promptings of the gain spirit in placing his property. Let us watch a case of property placing, noticing at the same time something of the forms of organization used in business.

Edwin Grant inherited $3500 from his father. What use should he make of it? There is not space to tell all the things he thought of, but here are a few samples:

1. He thought of "investing it in himself" by using it in taking an engineering course.

2. He studied whether to let the government use it by subscribing for a loan that the government was making. The government wanted money to build a canal. It would pay 4 per cent interest and would pay back the principal after 30 years.

3. A new ice-cream business was just starting up. It was a corporation and it needed a capital of $50,000 to make its start. The agent of the corporation tried hard to get Grant to take stock to the extent of his $3500, saying that he believed the company would be able to pay 10 per cent dividends.

4. Here is what he actually did with his money, and also with himself. He started a business of his own. It was successful and he later enlarged it by making it into a partnership and still later by turning the partnership into a corporation.

Setting up an individual firm. — Grant had been employed in a large printing plant.[1] He saw that his employer was making money, and he decided to use his inheritance and the money he had saved in starting a printing business of his own. His work had made him familiar with the

[1]Based on Lesson A-20, *Lessons in Community and National Life*—Cf. Marshall and Lyon: *Our Economic Organization.*

mechanical side of the business. He therefore had little trouble in picking out a good building in a good location, and in buying and setting up his machinery. Then he made his purchases of materials, such as paper and ink, and began business. He was a hard worker and a fine fellow. Through his friendships and through the good quality of his work his business soon began to show a steady growth.

AN INDIVIDUAL FIRM

The change of an individual firm into a partnership. — After he had been in business two years he decided that he ought to take in a partner. His reasons were that (1) the business was so successful that money was needed for buying more machinery, and (2) he needed some one to take care of the buying and selling, so that he could give more time to the shop. A salesman of another printing house was persuaded to be the new partner. The two men consulted a lawyer, who drew up a simple partnership agreement, or contract. This stated what each put into the business, and how profits would be divided (see page 404).

A PARTNERSHIP

The new firm was very successful. The work was better done because of the more specialized management. It presently became wise to take in a third, and then a fourth, partner. The amount of money invested in the business rose to $100,000. Even this amount was hardly enough to take care of the business which came to the firm.

THE PARTNERSHIP ARTICLES

Edwin Grant and Herbert Camp, both of the city of Zanesville, Ohio, hereby mutually agree to become partners under the firm name of "Grant and Camp" to conduct the trade and business of printing in the said city for the period of ten years from date.

The said Grant invests his stock of presses, paper, ink, and other material, estimated to be worth ten thousand dollars ($10,000) and the said Camp invests ten thousand dollars ($10,000) in cash.

Both partners shall give their entire time and shall share losses and gains equally.

All amounts earned or received by either partner for work, materials, or anything pertaining to the business shall be deposited in the First National Bank of Zanesville in the name of both partners, and shall be checked out as needed for expenses and supplies by the signatures of both partners. An equal amount shall be drawn each Monday morning for each partner for salary and personal expenses, but a balance of five hundred dollars ($500) shall always be kept and held.

When the firm shall be dissolved, all debts shall be paid, after which the balance shall be divided equally between the partners.

Witness our hands and seals this sixth day of September, nineteen hundred and thirteen.

Attest: Edwin Grant (L.S.)
Rachel Carroll Herbert Camp (L.S.)

The change of a partnership into a corporation. — Somewhat unexpectedly a good chance came up to enlarge the business again. It seemed wise to do so. The presses were crowded with work, and a larger business would mean the chance to purchase materials in such large quantities that they could be bought at a low price. Then, too, the larger business would make possible still greater specialization of machinery, workmen, and management.

However, the four partners did not have enough funds of their own and they hesitated to take in more partners. Since one partner can bind the others by his contracts, a firm hesitates to have a large number of partners. They again con-

sulted their lawyer and he advised them to form a corporation. This is what he told them:

All we need to do is to get blanks from the Secretary of State at the State Capital. When filled out they will give the name of the Company, its purpose, its place of business, the amount to be invested, and some statements about how the company is to be managed. At small expense, we can get from the Secretary of State a "charter" or "certificate of incorporation" for the company.

In your case, the thing to do is to have the ownership of this new business divided into 2000 shares or parts, worth $100 each. This makes $200,000, and I understand you wish to have a business of about that size. Your shop, machinery and materials are now worth $100,000. You can turn these over to this new business, taking 1000 shares in exchange. The remaining 1000 shares can be offered to others at $100 each. Of course, you four partners can buy some of the remaining 1000 shares.

THE STOCKHOLDERS
at the Annual Meeting
Elect

THE DIRECTORS
Who Direct the Policies of
the Company and
Appoint

THE GENERAL MANAGER

How a Corporation Is Managed

Each share will be entitled to one vote at the annual meetings of stockholders. These stockholders will elect a board of directors who will direct the policies of the corporation. The thing for you men to do is to own more than 1000 shares among you, and thus be able to elect yourselves to the board of directors.

Probably you will have no difficulty in getting others to invest. The business is a good one; you men are known as good managers; and there is an important point about a corporation that appeals to investors. A person who takes a share is liable only for the amount he puts in, if the business fails. We say the shareholder's liability is "limited," whereas the liability of a partner is usually unlimited.

The partners decided to change the business into a corporation. Each partner received 250 shares in exchange for his part of the old business and then took 10 more shares at

$100 each. The four partners thus held a total of 1040 shares and therefore had the majority of votes in a stockholders' meeting. The remaining 960 shares were quickly taken by others. At the first meeting of the stockholders, the four partners and two other persons satisfactory to them, were elected directors. These directors appointed Edwin Grant general manager of the corporation.

The business continued to be successful. Every year the profits were divided among the shareholders in proportion to the number of shares each owned.

Summary of place finding through the gain spirit.—This account of the work of the gain spirit shows us several things about place finding in our society.

1. To a considerable extent, individuals try to find out what tasks will pay best. Then they go into these occupations.

2. Individuals in our society often do more than merely place themselves. Often they also put property at work at things likely "to pay." Since ours is a "market society" this "property" can hire workers, rent buildings, buy materials and be used in other ways to make goods.

3. Our society has come to have certain schemes for organizing to handle the businesses that result from such actions. Edwin Grant started with what we call the individual firm. Later he had a partnership. Still later he was a shareholder of a corporation. We should think of these as organizing devices, as ways man has developed of working with others.

Although we follow somewhat the promptings of the gain spirit in finding our places in present-day specialized society, we do not depend entirely on those promptings. Far from it. In some cases society steps in with a "thou shalt" or "thou shalt not." In other cases, we follow our own tastes and

preferences, which may or may not agree with the promptings of the gain spirit. In still other cases, our desire to be of service may cause us to enter some occupation other than the one the gain spirit suggests.

Society directs us to our places to some extent. — Do you wish to be a lawyer? In most states you may practice law only after passing an examination in the law. This examination is conducted by the state in order to safeguard its citizens from foolish legal advice. Are you thinking of medicine? There is a state medical examination to be taken. These are but examples. The same situation exists in accountancy, in dentistry, in government bureaus, and in many others.

CIVIL SERVICE COMMISSION
CITY OF CHICAGO.

MARCH 31, 1924.

The Civil Service Commission of the City of Chicago will hold the following examinations in its examination room, 1006 City Hall, at 9 a. m. The Commission reserves the right under the subjects special subject, duties or experience, or all of them, to impose oral tests.

FIELD HEALTH OFFICER (all districts) part time, branch III, class M, grade 3, original $1,080-1,200, April 29, 1924. Scope—Special subject 5, experience 5.

WRECKING INSPECTOR, branch II, class D, grade 3, original, $2,100, May 14, 1924. Scope—Special subject 5, experience 5.

ARCHITECTURAL DESIGNER, branch II, class D, grade 4, original, $2,760-3,120, May 10, 1924. Scope—Special subject 5, mathematics 2, experience 3.

ARCHITECTURAL DESIGNER, branch II, class D, grade 4, promotion, May 10, 1924. Scope—Duties 5, mathematics 2, efficiency 2, seniority 1.

Eligible for Promotion—All persons employed as Architectural Draftsman, grade 3, who at the time of this examination are actually so employed or are on leave of absence or are eligible for reinstatement.

ARCHITECTURAL DRAFTSMAN, branch II, class D, grade 3, original, $2,280-2,520, May 12, 1924. Scope—Special subject 5 mathematics 2 experience 3.

ARCHITECTURAL ENGINEER, branch II, class D, grade 4, original, $2,760-3,120, May 21, 1924. Scope—Special subject 5, mathematics 2, experience 3.

ARCHITECTURAL ENGINEER, branch II, class D, grade 4, promotion, May 21, 1924. Scope—Duties 5, mathematics 2, efficiency 2, seniority 1.

Eligible for Promotion—All persons employed as Engineering Draftsman, grade 3, who at the time of this examination are actually so employed or are on leave of absence or are eligible for reinstatement.

Those desiring to take the above original entrance examinations must file applications with the Civil Service Commission, 610 City Hall, not later than 5 o'clock p. m. weekdays and 12 o'clock noon, Saturdays, of the day preceding the examination.

Those desiring to take the above promotion examinations must appear at the office of the Commission, 610 City Hall, prior to the date of the examination and register their names.

BY ORDER OF THE COMMISSION:
W F FOEHRINGER,
Secretary

HOW SOME GOVERNMENT POSITIONS ARE SECURED

There are, too, a good many things that society absolutely forbids. We are not allowed to "find a place" as a robber or a gambler, even if the gain spirit does urge it. In property matters, also, society steps in with regulations. It does not allow property to be used for making impure foods or alcoholic liquors. It allows property to be used for making certain drugs only under very careful rules.

Society does not use merely law in directing us. Public opinion also directs us. A trade-union man, for example, does not feel free to take a job at some plant where a strike is in progress. Because of a foolish prejudice, many persons go into "white collar jobs" rather than into those requiring

overalls. The fact that some jobs give the holder social position makes them attractive to certain persons. Prejudice and public opinion probably direct us a good deal more in our place finding than law does.

We also follow our personal tastes and preferences. — Money is not the only worth-while thing in this world. Many, many times we refuse to follow the promptings of the gain spirit because it is in conflict with our personal tastes. An example of this is shown in the third letter in my morning's mail, (see page 400). It says, in part:

Perhaps you remember that I prepared for work in finance and that I went to work in a bond house. Upon the whole I have done well, I suppose. Certainly, I have been promoted several times, and I am getting a good salary.

But, frankly, I do not like the work. That is no criticism of the work. It is all right. I simply do not like it. From my early boyhood I have always thought of doing the work my father did (he was a lawyer) and now I believe I shall not be happy at any other task. At any rate, I shall give up my present work the first of the month, and begin the study of law.

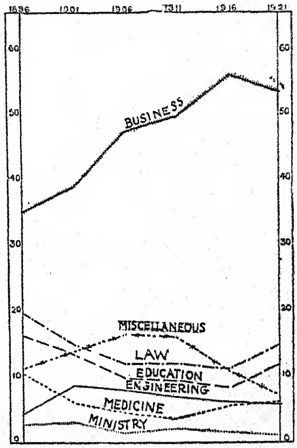
This letter shows early family surroundings "setting" one's tastes in a way one never forgets. It is not always so easy to account for one's tastes. No matter what causes tastes to be what they are, they enter largely into our place finding. Probably most of the teachers in our schools of law or medicine could make more money by practicing. They prefer to teach. The same thing is true of many other kinds of teaching. Then, too, there are our artists, the painters, sculptors, and writers. Most of them are rather indifferent to the promptings of the gain spirit. They are moved mainly by personal tastes to do the work they are doing.

Many are influenced by a desire to serve. — The fourth letter in my morning mail reads thus:

I am now pastor of a church in the southern part of the city. The work is pleasant. While the salary is not large, I am content with it. But

more and more I have come to feel that the best part of my present work is the educational part. When I went into my present work I hope I did so from a desire to be of service to society. I hope and believe it is the same desire that causes me to ask about the chances and ways of changing to the teaching field. I have no quarrel with preaching. Far from it. I just feel that *my* best service lies in another field.

The one question that really mattered with this man was "how can I serve best?" Fortunately for society there are many such persons. They are found in the ranks of teachers, preachers, settlement workers, government officials, physicians, lawyers, business men, and others. I know several very successful business men who are in business mainly to see if they can help find a solution to what we call our labor problem; several physicians and lawyers who are far more concerned with serving humanity than with making dollars. Everyone knows such persons in all sorts of occupations.



PERCENTAGES OF HARVARD GRADUATES ENTERING THE VOCATIONS NAMED

Summary of our place-finding activities.—This discussion of how we find the "right" places for ourselves and our property in this highly specialized society is certainly in sharp contrast with the discussion of how it is done under a caste system. We do not have the matter settled by the accident of birth. We follow the gain spirit in part; obey social control in part; follow our personal tastes and preferences in part; and seek the field of greatest service in part. Some of us, it must be admitted, just "drift."

Our society, at its best, is not organized on the plan of having us drift into places and then dawdle along. Quite

the contrary. Society is organized on the plan of having the individual (and that means each one of us) take the lead and work things out. In other words, society makes use of the plan that our scientists have come to call "individual initiative."

C. Individual Initiative, a Multiplier of Our Powers

(Working through private property and competition.)

Time after time we have seen that our society makes great use of individual initiative. It is left to individuals to decide what place they shall try to occupy in society; to decide how their property shall be used; to knit themselves together into a society of producing specialists. Society lays down general rules, and then expects the individual to scratch for himself. Why is this? The answer is that through long ages man has come to feel that individual initiative multiplies the powers of the group, because of the way it spurs the individual on.

In primitive society, the individual was not thus spurred on. Nearly everything was owned in common (see page 63) and all persons in the group lived the same dull, unprogressive life. As we have seen, through thousands of years this has been changed.

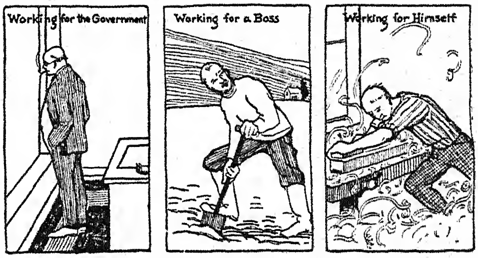
Individual initiative is a multiplier of our powers. — To-day it is as if society said to each of us: "See here, through thousands of years of blundering around it has become fairly clear that you human beings need to be spurred on. It doesn't seem to be 'in you' to work hard without this spurring; you have not yet developed enough love of your fellow man to work hard without a system of rewards and punishments. Very well, let's try the following system until we find something better.

"1. In the first place, let's use specialization, since that is a multiplier of our powers. Once we have our specialists, we can knit them together mainly through using the gain spirit in the market.

"2. In the second place, let's set up a system of rivalry, or competition. The person who makes good in this competition shall be rewarded; the one who does not shall be punished.

"3. In the third place, let's use private property instead of communism. Private property will have these advantages:

"(a) It will give the individual something to work *with* in this competition. He can own land, buildings, machinery, materials, his own labor, etc., and can put them to work.



WE HOPE FOR THE DAY WHEN MEN WILL WORK AS ZEALOUSLY FOR SOCIETY AS FOR THEMSELVES

"(b) It will give the individual something to work *for* in this competition. If he succeeds and makes profits, his reward will be more private property. He will have more wealth. If he fails and makes losses, the punishment will be that he loses some of his property. He will have less wealth.

"Here, now, is the idea behind it all. Where one sows, he reaps. No one should reap unless he sows. The better he sows, the more he can reap, and we'll try to provide, by rules of the game, that he shall sow and reap only things that are helpful to society."

This imaginary talk by society shows why we are justified in calling individual initiative another of the multipliers of man's powers. It develops his "will to do," his prudence, his care for the future, his watchfulness to prevent waste,

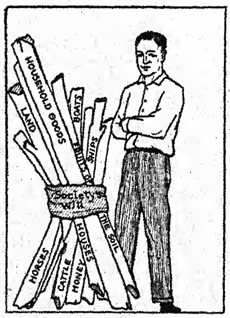
his sense of being responsible for results. There is no doubt that it has been, and still is, one of the great causes of human progress.

Since private property and competition are devices used in connection with our scheme of individual initiative, we need to know more about them.

Private property gradually came to cover many things. — No one knows the exact steps by which man came to have private property. Our first clear view of it is in the custom of the primitive warrior and primitive woman having the "exclusive right" to their own weapons, tools, clothing, and ornaments. Such things came to "belong" to one "private person" and not to the whole group, or to any other person. That is about as far as such exclusive rights extended among primitive peoples. It was so in the case of the Iroquois, you will remember (see page 63).

Gradually, through thousands of years of trial-and-error fumbling, it came to be felt that rights in private property worked well enough to be extended to other things. If we think of private property as a bundle of sticks, we may say that in primitive times there were only a few sticks in the bundle — such as weapons, tools, clothing, personal ornaments. Gradually other sticks were added to the bundle: property in horses, in cattle, in other domestic animals, in household goods, in houses, in fruits of the soil, in land, in money, in boats, in human beings (slavery),

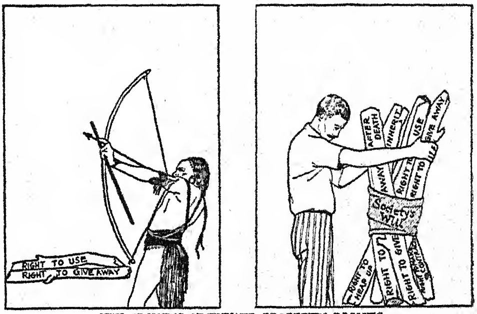
EARLY KINDS OF PROPERTY



SAMPLES OF MODERN PROPERTY

and in many other things. What sticks would be in the bundle varied from society to society and from time to time. In the United States to-day, the bundle is very large indeed.

Private property gradually came to include many rights. — Just as the number of *things* in the bundle gradually increased, so also there was a gradual increase in the number of uses a private person was allowed to make of those things. In other words, there was an increase in the *rights* over these things. Among the Iroquois for example, there were only two rights that were fairly clear; the right to use and the right to give away. From the time of neolithic man, however, there has been an increase of "rights," varying, of course from society to society and from time to time. In the United States to-day, we have such property rights as these:

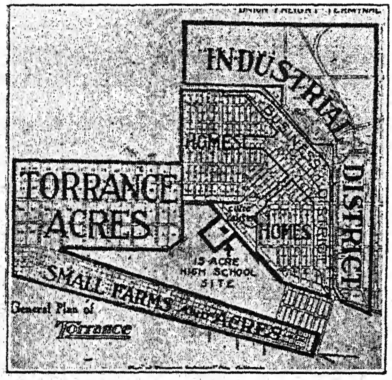


THE GROWTH OF PRIVATE PROPERTY RIGHTS

1. The right to use.
2. The right to give away during life.
3. The right to give away after death, called the right of bequest.
4. The right to inherit from members of the family.
5. The right to heap up property without limit.
6. The right to dispose of property by sale or lease or by making other contracts.

Society says what private property shall be. — We must not suppose that all the changes that have taken place in private property have been in the direction of enlarging it. Many changes have been in the direction of diminishing it.

For example, we no longer permit private property in public roads, bridges, or human beings (slavery). Many nations do not now allow private property in telephones, city waterworks, telegraphs, etc. Then, too, society does not hesitate to seize (and pay for) private property that may be needed for public use, such as land for school houses or parks or playgrounds or railroads. This right of society to take needed property is called the right of eminent domain. Again, the state feels free to take part of our property by taxation. In the main it does this to secure funds to carry on needed public services, but in many cases it goes farther. Some states have diminished the right of inheritance by levying heavy inheritance taxes. Some states have diminished the right to heap up property by levying income taxes the rate of which is very heavy on the larger incomes, and by "excess profits" taxes on unusual profits.



How One City Was Zoned

Again, we limit in very distinct ways the rights of private property in our public utilities, our industries in which the public interest is especially strong. For example, we say what kinds of contracts they may make and we limit their profits. There is, too, limitation of private property rights under the police power of the state (which assumes that everything must yield to the common good). As a result, the right to use property does not mean the right to use it in any way one chooses. The ashes from my furnace are my own, but I may not do what I please with them. I may not

even pile them in my own back yard if the wind blows them into my neighbor's house. So also, I may not use my land in a residential district for a dangerous powder factory, or for some factory that spreads poisonous gases. The zoning laws that so many cities are passing do not hesitate to limit the use that may be made of property in the various zones.

What then is private property? It is no one thing. It has varied from time to time. It varies from nation to nation. In general, it is *whatever bundle of rights society allows individuals to have over a changing bundle of things*. It is one of society's devices for getting things done, and it is a good device. Very few persons to-day would argue for wiping it out. But, of course, changing conditions may justify changing it somewhat from time to time, as they may justify changing any other useful device.

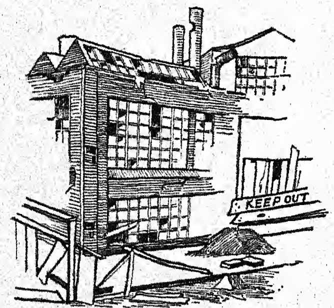
So much for private property. Let us now examine competition.

What competition does in our society. — Our scientists who study such matters (the economists) describe our society as a competitive society. This means simply that we strive and compete with one another in furnishing things to "the market" and in "making money" with which to buy things from the market. This competition is found in many parts of our living together. Let us look at a few examples.

1. *Through competition we settle into our places in society.* — Suppose that Oscar Charles starts out to be a lawyer. Others compete with him in that work. It turns out that he "can not hold his own"; he was not fitted to be a lawyer. It is best for him and best for society that he shift to some other occupation. Eventually, he turns to teaching and there he serves society successfully. Competition helped to determine what he should do; it helped to get him into a place suited to his talents.

2. *Through competition it is determined what industries shall go on.* — Several years ago there was a perfect craze for bicycles, and many persons put themselves and their property at work making bicycles. Presently, others began to offer cheap motor cars instead. Bicycles and cheap motor cars competed for the market. The outcome was that the bicycle industry ceased to be so important. So also the electric-light industry has checked the growth of the kerosene-lamp industry; the sweeper industry has checked the growth of the broom industry; the kerosene-cook-stove industry has checked the growth of the coal-cook-stove industry. It is mainly through the competition of goods in the market that it is determined what industries will pay best and thus continue in existence.

3. *Through competition it is determined what firm shall survive in an industry.* — Just as competition helps determine what industries shall go on, so it helps determine what particular firm shall survive. Not every firm in the motor-car industry, the electric-light industry, the sweeper industry, or the kerosene-cook-stove industry has prospered. Not every firm in the bicycle industry has failed. Some firms have better locations than others. Some have better managers than others. The capable firm gradually wins business away from the poor firm by better service or lower prices or both. True competition lets those survive who are best fitted to serve.



WHY IS THIS FACTORY IDLE AND IN BAD REPAIR?

4. *Through competition it is determined what methods of doing things shall survive.* — New ways of doing things are continually being invented, and sometimes these new ways

drive the old ways out of existence. The railroads have largely driven out the canals. The steamship has largely displaced the sailing vessel. The Bessemer and open-hearth methods (page 98) have displaced the Cort method. All the enormous changes in methods of doing things that have come to pass in the last few generations have won their way through competition.

BUTCHERING IN THE 16TH CENTURY

From an old print

COMPARE THIS WITH THE PACKING PLANT SHOWN ON PAGE 376

Hit the line hard. — We certainly live in a very interesting society. *Apparently* everyone is busily engaged in chasing about after his own specialized affairs. *Actually*, we are all engaged in a vast coöperative enterprise. In this teamwork we use many devices. Among them are the gain spirit, individual initiative, private property, social regulation, and competition. Some of these are devices for getting us into our places. Others are devices to make us work hard, to make us pull our share of the load. As we shall see later, the arrangements are not perfect, but that is another story.

What we are *trying* to do was once put thus by Theodore Roosevelt: "To borrow a simile from the football field, we believe that men must play fair, that there must be no shirking, and that success can come only to the player who hits the line hard."

As we study this statement, we see that it says: (1) Our society is one of teamwork; we are all coöperating in the wonderful enterprise of living together. (2) There are rules of the game and we must honorably live up to them, each in

his own place. We must gouge neither our opponents nor our teammates. We must play fair. (3) There is much to be done in our society. Let us work hard. (4) Much depends upon individual initiative. He who would succeed must hit the line hard, playing always as a worthy member of the great team, society.

Problems

1. Define or explain:

Finding one's place	Income tax	Private property
A partnership	The gain spirit	Limited liability
The right of inheritance	Individual initiative	A zoning law
A caste system	Right of eminent domain	An individual firm
Inheritance tax		Competition
		A corporation

2. Why is it better for us to endure the trouble of finding our places in our society than to live in an unspecialized society?

3. Why is it better for us to endure the trouble of finding our places in our society than to live in a caste society?

4. "It would be a terrible thing for America if we should come to have rigid classes that would, through the centuries, develop into castes." Do you agree? What things would be different, if this should happen?

5. Does one's position with us depend upon his birth? Does it depend more on his performance? If it does, should that make one work and strive harder?

6. "The caste system checks the growth or widening of sympathy." Why?

7. "The market knits our specialists together and it also, through the promptings of the gain spirit, helps each specialist to find his place." Explain how this is done.

8. Several times in his business, Edwin Grant borrowed money from a bank. Show that our banking system is a device for helping get property into businesses where it is needed.

9. How are the profits of a partnership divided among the owners? How are the profits of a corporation divided?

10. Show that the individual firm, the partnership, and the corporation are devices for organizing to get things done. Is a caste system such a device, too? Is a communistic society?

11. Give cases or illustrations other than those in the text in which society takes a hand in placing an individual or property.

12. Give cases or illustrations other than these in the text in which an individual follows his personal tastes in finding his place.

13. "Persons often use property for purposes out of which they know they will get no gain." Is a gift to a college such a case? Mention several cases. Why do persons use their property thus?

14. "He who makes good in competition shall be rewarded; he who does not make good shall be punished." What are these rewards and punishments, in the business world?

15. "We shall try to arrange it, by rules of the game, that the individual shall reap only through serving society." Give illustrations. Is that why burglary is forbidden?

16. Talk with your father about the number of things over which he has property rights. Has he property rights in his own labor? Can he sell it?

17. "Property is one of the unchanging rights of every individual." Show that this is nonsense.

18. "Private property means the right to do what you please, for all time, with everything in the world." Point out the parts of this statement that are untrue.

19. Suppose that we can prove that John stole a knife from James. Show that although John has *possession* of the knife it is still the *property* of James. Show, then, that private property rights are something society stands ready to enforce, if necessary.

20. Give illustrations other than those in the text of competition settling what industries shall go on. Give illustrations of its settling what methods shall survive.

21. "Competition determines what firm shall survive in an industry." Just how does competition do this?

22. "Individual initiative, taken in connection with private property and competition, can develop strong characters, earnestness, productiveness, inventiveness, and energy." Show why this is true.

23. Answer the questions at the beginning of this chapter, page 394.

Interesting Reading

Marshall: *Readings in the Story of Human Progress,* Chapter XIII.

1. The Social Life and Industries of Ants (division of labor and place finding governed by instinct).
2. Slavery (a way once used to get the work of society done).
3. Woman's Place in Modern Culture (the tasks and opportunities of woman in our society).

See also:

Chapter II, 2. Woman's Share in Primitive Culture (early division of labor).

Chapter XV, 2. What a State Does (a partial list of the ways in which the state touches our lives).

Chapter XVI, 2. Vocational Guidance (how one city school system handles this work).

Chapter XVII, 2. Michael Faraday (an example of devotion to scientific truth).

Chapter XVII, 3. Thomas Nast (an artist who was a standard bearer of ideals and aspirations).

Chapter XVII, 4. Howard Taylor Ricketts (an example of devotion to the ideal of service).

Problems to think over are given in these reading selections.

CHAPTER XIV

SOCIAL CONTROL: CUSTOM, LAW, PUBLIC OPINION, AND THE SENSE OF DIVINE APPROVAL

A. Custom, a Link with the Past
B. Laws, the Exact and Definite Rules of the Game
C. Public Opinion, a Tool of Educated Democracy
D. The Sense of Divine Approval

Questions to Keep in Mind while Reading This Chapter

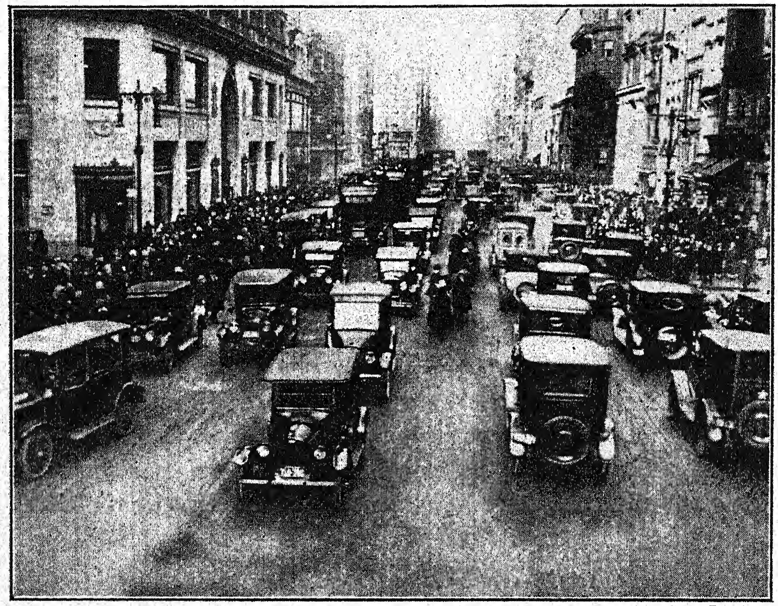
1. What part does custom play in our living?
2. Where does our law come from? What is its task?
3. How can public opinion be made an effective tool of democracy?
4. What is meant by calling conscience and religion means of social control?

In the last two chapters we have seen that man, the social organizer, makes his living by means of a great coöperation of specialists. In this process he makes use of such devices as the market, the gain spirit, private property, competition, and social control. In the next two chapters, we shall learn more of the device, social control.

There is need of social control. — A man once had a strange dream. He dreamed that he stood at the busiest street corner of one of our large cities and looked at the scene. On one side of the street three lines of automobiles were moving north in swift and orderly fashion; on the other side, three lines were moving south. In the center two lines of street cars went clanging on their way. On each sidewalk two great crowds of people were hurrying along, each crowd keeping to the right. Two policemen were taking care of the

traffic, letting east and west traffic through at proper times. Although the traffic was very dense, there was not much confusion. Nearly everyone seemed to know what was expected of him.

Then came the strange part of the dream. A sudden madness fell upon that street. The persons in the street,



Courtesy of Alexander Hamilton Institute

ORDER IN A BUSY STREET

including the policemen, forgot all the "rules of the game." They forgot that it was the custom to keep to the right; they forgot all the traffic laws of the city about parking, about who had right of way at crossings, about how to pass a street car, about the kind of signals to make — everything. In a twinkling of an eye, that corner saw a wild, cursing, fighting

mob scrambling over the wreckage of dozens of automobiles and street cars. Orderly progress had ceased.

This nightmare of the happenings at a busy corner when social control was lost for a moment is a fairly good illustration of what would happen in our whole society if we should suddenly forget our customary ways of doing things and all government and law. Our society of specialists is about as busy as that street corner, and the opportunities for getting things into a terrible snarl are about as numerous. It is fortunate for our living together well that man, the cooperator, has methods of social control. We shall examine some of the main kinds of our social control in this and the next chapter. Custom, law, public opinion, the sense of divine approval, and government are the ones that will be studied.

A. Custom a Link with the Past

(Where our customs come from; the advantages and disadvantages of custom; custom the basis of institutions.)

Early man worked out practices that changed very slowly. — Let us recall certain things that we have learned about the way early men lived.

1. *Trial-and-error practices.* — We have learned that the people of those early days could not think things out by our modern scientific methods. Their method of finding out the "right" way and the "wrong" way of doing things was that of blind tinkering and trying — that of trial and error, (see page 145). It is hard for us really to understand what a slow, groping process that was. The most ignorant of us have had such a mass of stored-up knowledge handed on to us by the torchbearers discussed in Chapter X that our gropings have a good deal of thought and plan behind them. Not so with early men. They blundered and tinkered for

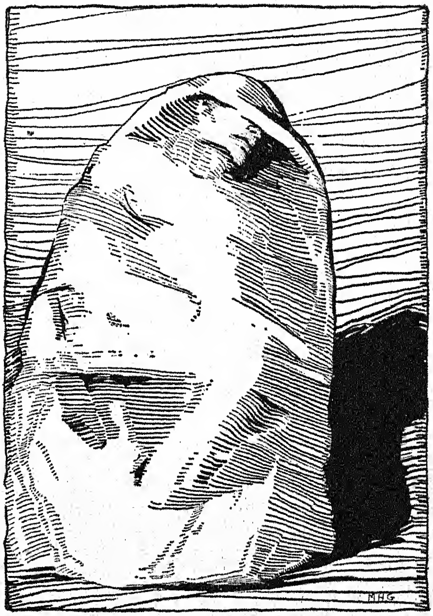
generation after generation. Very slowly it came to be felt that certain ways "worked" and other ways did not. Some of the conclusions they reached seem absurd to us to-day, but they did not seem absurd to early man.

2. *Slow changes.* — We have learned that in those long ago early days, there were very few changes in ways of living, and these changes were exceedingly slow ones. Rarely, indeed, did early man find a multiplier of his powers that would change his ways of living, and then thousands of years would go by with only slow additions to his powers. We have had more change in the last one hundred years than early man had in thousands of years. As compared with our rapidly changing life to-day, we say that the life of early man was fixed, rigid, unchanging. This does not mean that absolutely no changes ever occurred. We have seen that slow changes did occur. But the word "fixed" describes their living better than the word "changing"; whereas the word "changing" describes our living better than the word "fixed."

3. *Early torchbearers.* — We have learned that even very early man was a communicator. He could pass the experiences of the race and its ways of doing things along to later generations. He had quite a few torchbearers for this purpose. The talk and councils of the elders; the yarns of the story-tellers; the examples and teaching of the family group; the ceremonies, feasts, and dances; the games and sports of the children; these were some of the more important torchbearers.

4. *The cake of custom.* — If we add together these things we have learned about early man, we can easily understand how "right" ways of doing things would be learned (oh! so slowly!), and would be passed on down through the generations of an "unchanging" society. The whole group, or

society, through thousands of years would come to have very set, rigid, fixed ways of doing almost everything. We call these fixed, unthinking ways, the ways of custom. We say that such a group is controlled by custom. Our scientists talk of such a group as being "held in the cake of custom." By cake, they do not mean our table delicacy: they mean the kind of rigid, stiff chunk we get when clay "cakes" in drying out. A group, then, that is held in the cake of custom is one whose thoughts, acts, beliefs, and ways of living are ruled by customs. Some of these customs are wise; some are foolish. Some are good; some are bad. They rule, in any event. And their rule is very rigid and unyielding.



EARLY MAN WAS HELD IN THE CAKE OF CUSTOM

He lacked freedom of thought and freedom of movement.

Custom did secure some group coöperation — but it also hindered progress. — There were both good and bad features about this cake of custom. Its best feature was that it did hold the group together and did set ways of doing things. We must remember that schools, churches, trading, government, laws, etc., as we know them, did not exist in those days. Those early peoples had only custom. Custom set what was to be

done and how to do it. It gave rules of the game for the coöperation of the group. To be sure, to-day we know that many of those rules were poor ones. But it was worth while to get started at having rules. It was a step in progress.

The worst feature of custom was its lack of change, its rigidity. Everyone must do things as they had always been done. Clothing and food and shelter must not change, generation after generation. Dances, festivals, initiations into grown-up membership with the tribe, and all other aspects of living must go on as they had always gone on. On the other hand, certain things must not be done at all. They were "taboo." Certain foods must not be eaten; certain actions would offend the spirits, and must never be done.


A SILLY SUPERSTITION

Life went on century after century with almost no change. If it is hard to believe that people could be so unchanging, we must remember that custom ruled men's minds completely. There have been plenty of cases where savages who have accidentally broken some taboo have actually died of fright when they saw what they had done. And the taboo might be as foolish as "don't walk under a ladder," or some other silly superstition. After all, it is not hard to see why custom ruled their minds so completely. All the torchbearers of such a group passed on custom, custom, and nothing but custom. A new idea rarely entered peoples' heads. Of course, this caused progress to be very slow indeed.

How the cake of custom was slowly softened. — But, through the long ages, practices and the resulting customs

did change a little. Gradually, some new multiplier of man's powers, such as agriculture, would be found and then ways of living would change. Or a group wandered into a new territory where living was different and new customs arose. Or some captive, brought back from a raid on another tribe, might have a new practice that would be taken up by his captors. Slow progress was made.

Medieval Man Was Still Fettered and Blinded by Custom

We know how slow this progress was. In case after case of the matters we have studied in this book, there were thousands of years during which man made only slow additions to the powers he had had as long ago as the time of neolithic man. There were a few little spots on the earth where progress was somewhat faster, but as recently as four or five hundred years ago the people of our mother country, England, were still very largely bound by the cake of custom. (See pages 277 and 281.)

We know, too, why it is that more and more we are breaking away from blindly following old customary ways. We have seen how the Rebirth of Learning began to open men's minds; how the great geographical discoveries and explorations gave knowledge of other peoples and other ways of

living; how the printing press could spread the new thoughts and new ways. We have seen how in the last one hundred or one hundred and fifty years man has become such a wonderful harnesser, communicator, transporter, and trader that his mental horizon has widened greatly. Most important of all, he has become a scientist, and a scientist insists on carefully tested knowledge. (See page 144.) He refuses to act and think in certain ways just "because it has always been done that way." The great school systems and the press and the talk and discussions in which all of us engage gradually spread scientific knowledge and kill customary ways that can be shown to be no longer "right."

Modern Man Is Less Fettered and Blinded by Custom

The cake of custom has softened a bit. But no one should imagine that it was an easy task to soften it or that the task has been finished. Even to-day one occasionally sees an account in the newspaper of a foolish community in our own country thinking that there is some witch in its midst! For that matter, I know several persons who refused to ride in an automobile or to use a telephone because they "couldn't believe the Lord ever intended such pesky new-fangled contraptions to be used. The good old ways were good enough

for them." If persons can talk thus after all that the last hundred years have meant, it is certain that customary ways die hard.

Here are the more important ways in which custom affects our living to-day.

1. **To custom we owe many foolish fears and silly superstitions.** — Custom harmfully affects our living to the extent that our torchbearers, such as the family, the school, and the press, have passed along to us many foolish customary fears and superstitions and taboos. Anyone who made a list of these would be surprised at its length. The fear of ghosts, the dark, goblins, and ogres might well begin such a list. Then would come such superstitions as Friday and thirteen being unlucky; a rainy day for a marriage causing a sad married life; and a new moon seen over the left shoulder meaning misfortune. What a blessing it would be if our minds could be free of such stuff! Our minds *could* be free if our torchbearers would stop passing the trash on.

2. **Custom saves us much time and effort.** — Custom helpfully affects our living by giving us ways of getting a great many things done and out of the way. Because of custom we continue to call the days of the week after the old Teutonic gods: Wednesday is Wodin's day, Thursday is Thor's day. We continue to call the months of the year after Roman gods and heroes: March is named after Mars, August after Augustus. We follow old Teutonic customs and festivals in our Easter observances, our Santa Claus, and our Christmas tree.

We lift our hats to ladies; shake hands (rather than rub noses as some peoples do) in greetings; regard it as bad manners to smack our lips when eating (although some peoples think that the only proper way to eat); keep to the right

when passing (although some peoples keep to the left); begin and end letters in customary ways; wear certain kinds of clothing according to sex; give Christmas gifts and birthday presents; send invitations to parties in the "proper form"; use knife and fork and spoon "properly"; decorate our heroes with badges; sit in chairs instead of crossing our legs on the floor; think it very improper to appear in public in pajamas, but quite all right to be seen in bathing suits; wave our hats when cheering at a ball game but applaud only with our hands in the theater and never applaud at all in church; whistle for a dog but not for a cat; wash our faces and comb our hair before breakfast; — there is no end to our customary ways.

Such harmless customs are great time savers and effort savers. They enable us to take care of a host of the small things of life without thought. Suppose that we had no customs, but that from the time our eyes had opened this morning we had had to *think out* and *plan out* absolutely everything, even to debating with ourselves whether certain things were worth doing. What a lot of time and energy we should have wasted puzzling how to get out of bed, whether to wear clothing, what kind of clothes to wear, how to wear them, how to wash, how to part our hair, or whether to fix it at all. We should never have reached the breakfast table, if, indeed, we had decided that there should be one! Customary ways are great helps.

3. **Custom is the foundation of our institutions.** — Custom affects very greatly our living because it is the soil out of which most of our institutions have grown.

Think back over our accounts of man, the trader (pages 275, 284); of money as the language of trade (pages 286-289); and of the many financial institutions we have to-day (page 294). Trading began in very awkward practices. Through

the long centuries those practices gradually changed and money came to be used. The use of money was, for still other centuries, just a customary practice. Finally peoples came to use coins. Much later governments passed *laws* about coins and coinage. If our account had been a full one we should have seen that banking began with "fumbling practices" of money changers and goldsmiths in providing places for the safe-keeping of money. Gradually people came to think and plan about banking institutions. Finally governments passed laws about them. Clearly, our laws and institutions connected with trade and money have grown out of practices that "worked" and became customs.

What is true of our trade and money is true of just about everything else. It is true, for example, of private property, of competition, of the family, of the school, of the church, of law, of government, and of our forms of business organization. If it is true of such important matters as these, it is easy to believe that it is true of most other aspects of our living together. How this has all worked out may be put in the form of a diagram thus:

PRACTICES through long ages become	CUSTOMS which are passed along by torchbearers	Some customs are on such important matters that there emerge INSTITUTIONS and LAWS and RULES and CODES OF ETHICS. Often planning or thinking has played a part in these.

Custom is a powerful means of social control. — There is no doubt that custom is one of the main means of social control used in our society. Although it no longer holds us in a rigid "cake," it still guides a whole host of our unimportant acts, and it is the basis or foundation of our institutions and laws and codes of conduct in quite important matters. It is handed down to us mainly by the two torchbearers,

family and church, but men's minds are so full of it that the school and the press and our ordinary talk and discussions also hand it on.

B. Laws, the Exact and Definite Rules of the Game

(Common law and statute law; what law does; how law should be regarded by the members of the group.)

Another of our devices for social control is law. It has its roots down deep in custom, but it has also made use of thinking and planning.

The two parts of our law illustrated by the law of mining. — Our law is made up of two parts, — common law and statute law. What these terms mean can best be understood by seeing how these two parts of our law came into existence in the case of our law on mining.[1]

What is now the state of California, as well as much other territory in our Southwest, once belonged to Mexico. The treaty with Mexico (the treaty of the Guadalupe Hidalgo), which finally settled that we were to have this land, was made February 2, 1848. On February 12, 1848, the officer representing the United States in that region (the military governor) proclaimed that the Mexican laws and customs concerning mining should no longer apply. Since there was no United States law on mining, this left the territory without any mining law. Now notice how that mining law came into being.

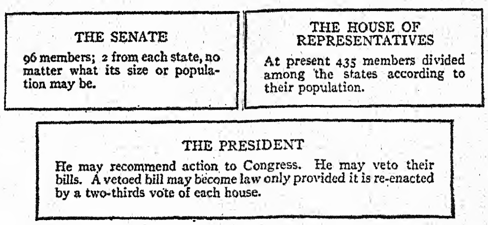
Common law grows out of customary practices of the people. — In the same year, 1848, gold was discovered in that region and a regular flood of gold miners poured in. What happened? These were an order-loving people. Very quickly certain "practices" or ways of laying out the claims, the width and depth of the claim, the number of claims one

[1]Based on Lesson A-17, *Lessons in Community and National Life.*

person might own at one time, what should be considered good proof of the ownership of a claim, etc., came to be "accepted." These practices came from many sources. Some of them came from the former Mexican mining practices. Some came from the thousand-year-old practices and customs of tin mining in Devon and Cornwall, England. Some of them were just worked out on the spot by the miners themselves. Taken together, the rules and regulations growing out of these practices came to be known as the Miners' Common Law for that region.

Statute law is made by our legislatures. — As time went on, it was seen that most of this Miners' Common Law was very good indeed, but that some of it needed to be changed. Our Federal Congress studied the matter and, in 1866 and again in 1872, passed statutes setting up statute mining law.

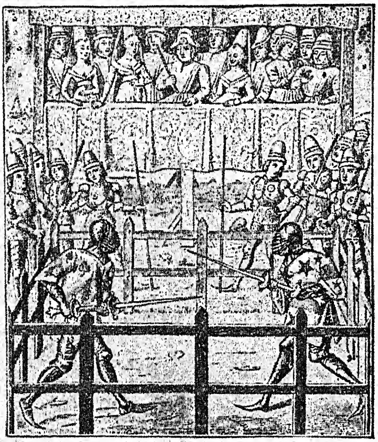
Statute law, then, is law or a system of rules set up by our governing bodies. We call such rules statutes or enactments. In America the usual procedure is this. In either the upper house or the lower house of the legislature, a member introduces a *bill* dealing with some matter on which a law is desired. A bill usually starts "Be it enacted, that, etc." If this bill, after being considered in the proper way, is passed or enacted by one house, it then goes to the other. If the members of this second house also vote in favor of it, it goes to the Governor (to the President in the National Government). If he does not veto (*veto* is a Latin word meaning "I forbid") it, we have a statute, a piece of statute law.



THE LEGISLATIVE AGENCIES OF OUR NATIONAL GOVERNMENT

How our common law started in England. — Most of our common law is much older than the Miners' Common Law. Most of it started long ago in early practices in the mother country, England.

Let us go back to the England of a little less than a thousand years ago. It had only a small population, living in little scattered groups. What we call government was far simpler than it is now; the people were held in the cake of custom. Simple and unchanging as the life was, of course disputes would occasionally arise; disputes that had to be settled somehow. One way of settling them was to have some one in authority hear the quarrel (this has become our court system of to-day) and state what were the customs of the land on such matters. This was not a bad way of settling such a quarrel. It was a much better way than another method the people had of letting the opponents fight it out — as if the stronger man would always have justice on his side!



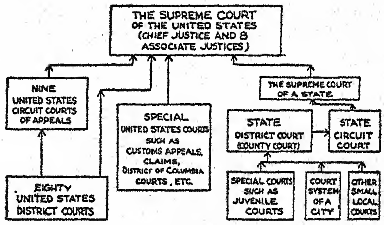
Courtesy of West: Modern Progress, (Allyn and Bacon.)

TRIAL BY COMBAT
(Taken from an old print)

As time went on, persons we call judges (who represented the government) came to preside in these courts and to declare the customs of the land, sometimes making use of twelve men — the beginnings of our jury system. Furthermore, it came to pass that some of these decisions were written down. Then they could be studied and followed by

other judges. One decision followed the ruling of a preceding decision. We call that "following precedent." In this way, the law based on the customs of the day gradually became a quite definite, well-known law that was the same in every court, — was "common" to all England.

Judges not really the makers of law. They interpret and apply it. — Sometimes the common law is called "judge-made" law, but that is not the best name for it. It was really "made" by the practices and customs of the people. The judges merely declared or applied law that had already been "made." They acted as interpreters and then as torchbearers to pass it on to other districts and down to later generations — much of it down even to us.



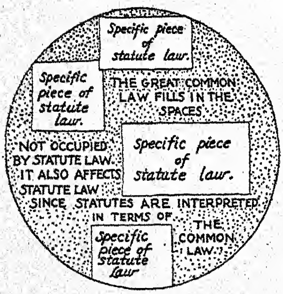
THE SYSTEM OF COURTS IN THE UNITED STATES

This is, of course, merely an outline of our court system. The arrows show how certain important types of cases can be appealed up to the Supreme Court of the United States.

From this story of how common law has come down to us, anyone can see that it is fairly rigid law and that it changes very slowly. In the main, precedent is followed. It is natural, therefore, in such rapidly changing times as ours, that some piece of common law may not be good sense now, even though it was good sense when it started. But our judges are not free to make great changes in it, any more than judges made it to begin with. The best they can do is to interpret and apply it as sanely as possible. When a piece of common law has outlived its usefulness, the legislature should get to work, and enact a statute abolishing this particular piece of common law and setting up good statute law in its place. The judges will then apply the good statute law on this subject.

The three things done by statute law show the importance of the work of our lawmakers. — This brings us back to our statute law. As we have just seen, some statutes are enacted in order to wipe poor pieces of common law out of existence. That is good service. Other statutes merely restate good common law so that anyone may see it set down in a simple way that is absolutely uniform throughout the state. That, too, is good service. Other statutes do a third useful thing. When some new problem arises on which no common law has grown up, the legislature enacts statutes that are to be the law of the land on that problem.

As we think of these three services of statute law, we see that in statute law we have an opportunity to work our modern scientific knowledge over into definite rules of action for our society. What a wonderful chance this gives the members of our legislatures to be of service to the group! How careful we should be in selecting our representatives for the legislature! How much use they should make of our libraries of books (the memory of the race, you will recall) and of advisers having expert knowledge in various fields!



How Common Law and Statute Law Work Together

What our statute law and common law, hand in hand, accomplish. — Statute law and common law do their work hand in hand. Statute law is the part of the law that has been worked out by the legislatures. But no legislature could be wise enough to frame laws covering every possible dispute that might ever arise. Therefore, there are still large areas of the law that are simply the result of customary practices. Our courts carry out both statute law and com-

mon law. Both are *law*, — one just as truly as the other. Both have been "approved" by the community as part of its rules of the game. Both help wonderfully in living together well.

Law says, "Thou shalt not," — it prohibits some things.— Some persons have wrong ideas about law. They think of law as something that is always saying "Thou shalt not." Now, it is true that we do use some of our laws for the thou-shalt-not purpose. The other day a man stole an automobile. When he came before the judge in the court he found (what he already knew) that society had forbidden stealing other people's property and that it punishes those who do so. There are many things, such as stealing, murder, setting fire to people's property, betraying the government, etc., that are harmful to living together well, and society has said, "Thou shalt not."

LAW DEFENDING CIVILIZATION

Law also says, "I'll help" — it promotes some things.— But we must not think of law merely as a great thou-shalt-not. That is only one aspect of law. Another aspect of law shows it to be a helper. Remember that law is society's desire, or wish, or will, set forth very definitely. Sometimes society wishes something done, and uses a law to help get it done. Take the laws, for example, by which the United States government helped build transcontinental railroads by giving them strips of public land and by loaning them money. Or think of the laws providing for schools and the laws for raising taxes in

order to build roads with the money. As a matter of fact, law says "I'll help" more than it says "Thou shalt not."

And even more frequently law helps by saying, "I'll just give rules for doing things so that everyone will know what to expect of everyone else." Our partnership law lets each partner know his rights and duties and lets the customers of the partnership know their rights and duties. Our corporation law does the same. (See page 405.) Our contract law tells how to make contracts that will bind those who make them. This work of law — the work of making it possible for everyone to go about his affairs with the rules of the game certain and well known—is a most important service. It enables us to work together and to live together with quiet confidence that we know what to expect. We can therefore give our full thought to our work.

ENFORCING RULES OF THE GAME

An estimate of law as a means of social control. — These things may be said of law as a part of our social control.

1. *In a democratic country like ours the laws are really made by ourselves,* for they are made by persons whom we elect to represent us. Of course, our common law has come down to us from the everyday practices of earlier generations. But even this common law can be changed by our representatives.

We ought not to think of law as some goblin "that'll get us if we don't watch out." We ought to think of it as a statement of the ways of living that long experience has

shown to be good. A physician gives us rules of good health; he makes better rules as he learns more about the human body. Our laws are part of the rules of good health for a community; we can make better laws as we learn more of how a community is put together and what will make it healthful. Is not that one of the reasons why social studies are taken up in our schools?

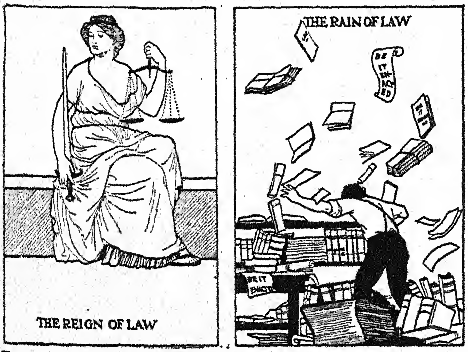
2. *Law is expensive, it costs money, it means taxes.*—Our law is not made and carried out by magic. We pay for it. There is always the cost of electing and paying the members of the legislature and of conducting its meetings. There is the cost of the system of local, state, and federal courts, including buildings, and the salaries of judges and other court officials. There is the cost of maintaining prisons, jails, reformatories, and police systems.

In thinking of the taxes we pay we should remember that everyone mentioned in this list of costs is our servant. We pay for his work and we want that work done honestly and well. When a police officer or a judge protects and aids a known wrongdoer (and this is sometimes done) we ought to despise him as we would one who put harmful germs in the reservoir from which we get our drinking water. In both cases harm is done to healthful living together. Of the two cases, that of the corrupt officer of the law is the more despicable, for he is a thief as well. He has taken public money for work and has not done his work.

3. *Law should be carefully drawn and then observed by all.*—Law works best when society is quite clear as to what it wants done and is willing to have a definite rule that everyone, great or small, must obey. Such an expensive and definite device ought to be used with great care.

Unfortunately we are not as careful as we should be. Each year our national legislature passes several thousand

laws. Each year our states pass about 15,000 laws and our cities about 200,000. It is estimated that the United States has to-day more statutes and ordinances than all the rest of the world. The ordinary man would need one third of a lifetime merely to read the laws applying to him! It is clear that all this mass of statute law cannot have been thought out carefully. There is a good deal of confusion in it.



LET US TAKE CARE THAT THE RAIN OF LAW DOES NOT MAKE US LOSE RESPECT FOR THE REIGN OF LAW

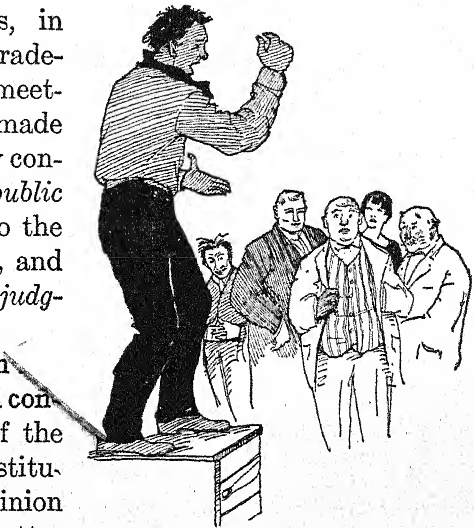
The worst of this confusion is that it lessens our respect for law. It is of tremendous importance that we keep our respect for law. No game is clean unless the players respect the rules. No society is safe unless its members respect its rules. We ought to be like the Greek philosopher, Socrates. He was in prison and sentenced to death. Some of his friends, by crooked work, arranged to set him free. "No," said Socrates, "above all things we should faithfully keep the laws. I will not escape."

C. PUBLIC OPINION, A TOOL OF EDUCATED DEMOCRACY

(How public opinion controls; how it is formed; when it can do its work well.)

An illustration of the formation of public opinion.—On December 12, 1922, the people of the State of Illinois went to the voting places or polls and voted by a large majority to reject the new state constitution submitted to them.

For many years the old constitution had been regarded as unsatisfactory. The new one was the result of much planning and thinking on the part of a constitutional convention organized for the purpose. While the new constitution was being drafted, and especially after it was submitted to the people, a very earnest discussion of its provisions went on all over the state. In newspapers, in pamphlets, in club meetings, in trade-union halls, in public meetings, arguments were made for and against the new constitution. Gradually *public opinion* unfavorable to the document was formed, and at the polls a *public judgment* was given.



ONE WAY OF FORMING PUBLIC OPINION

Public opinion is an important means of social control. — This account of the rejection of a new constitution shows public opinion being formed on a matter of great public interest where a definite decision or judgment was needed. On less important questions, public opinion is formed in much the same way, although it may be formed more slowly and with less heat of argument. No matter how it is formed, it is one of our important means of social control.

In everyday affairs. — In the first place, public opinion guides and controls the ordinary person in his everyday life. No one likes to have the other members of the group "down on him," and so no one (or almost no one) will disregard

public opinion. This is not merely because one feels uncomfortable when the group does not like him. In addition to one's feelings in the matter the group has ways of "getting at him." It may snub him and his family; it may refuse to buy and sell with him; it may shut him out of pleasant and profitable happenings. The very word "boycott" comes from a case where a group took such action against a man. In Ireland a man named Boycott became disliked because of the way he dealt with tenants. The group would have nothing to do with him. He learned to his sorrow that public opinion can greatly influence people's actions.

As a director of government. — Another important way by which public opinion plays a part in social control is through its effect on government officials. This is especially true in a democracy like ours where election and reëlection depend upon keeping a favorable public opinion. Some of our presidents, for example, have been careful to "feel out" public opinion before taking an important step. They have arranged for a news item concerning this step to get widely published. They then have watched the "drift" of public discussion of this item, as the discussion appeared in editorial comment or in speeches of important persons. Our senators and representatives in congress and in our state legislatures are always watching the drift of public opinion as seen in editorials, letters from their constituents, speeches, pamphlets, and "resolutions" of all sorts of groups. Often it is said that we have "government by public opinion." That is claiming a little too much for public opinion, but there is a great deal of truth in the statement.

Groups that help to form public opinion.[1] — *Political parties.* — One way by which we form public opinion is by the use of political parties. Everyone knows of the Repub-

[1]Based on Lesson C-19, *Lessons in Community and National Life.*

lican and Democratic parties. As time has gone on these parties have worked out schemes of organization for holding themselves together; for forming "platforms" or declarations of what they believe in; for nominating men for office; and for persuading people to vote on their side. They issue

A Party Convention to Nominate a President

tens of millions of pamphlets and books, hold public meetings, have parades, send out "workers" to persuade the wavering, put up posters, advertise in the papers, publish arguments in the papers — do any and all reasonable things to form a public opinion favorable to their cause. Any political groups that oppose these main parties, including occasional groups of "independents" who break away from them, find it worth while to follow much the same tactics.

Nonpartisan groups watch political matters. — There have grown up, in many places, nonpartisan groups which influence public opinion by studying and reporting on the qualities of persons nominated to office by any party; or by studying and reporting on the actions of officials who have been elected. The Municipal Voter's League of Chicago and the Civic Leagues of St. Louis and Cleveland are examples of groups that publish their judgments of the fitness of candidates for office. The New York Bureau of Municipal Research and similar bureaus in such cities as Philadelphia, Cincinnati, and Chicago, as well as various "civic leagues," "citizens' associations," and what not, are examples of groups that study city governments, suggest improvements, and keep the public informed. Worthy of mention too, are the "City Clubs" of various cities. These groups have clubrooms as centers of operation. Through committee reports, through public discussions, and through bulletins they influence public thought and conduct.

Groups formed for some one purpose.— Then, too, there is a great host of groups interested in some one matter. At this they work, studying, planning, making suggestions, and reaching the public by letters, bulletins, advertisements, news stories, public meetings, or other devices. Here is the merest beginning of a list of such groups. It does not matter if you do not at this time understand the work of each of them. There are immigrants' protective leagues, civil-service-reform associations, housing associations, playground associations, infant-welfare societies, law-and-order leagues, legal-aid societies, juvenile protective associations, municipal-ownership leagues, immigration-restriction leagues, commission-government clubs, short-ballot organizations, anti-tuberculosis societies, public art leagues, and tax-reform associations. There is almost no end of them.

Furthermore, groups formed primarily for business or social or educational or other purposes often carry on some activities affecting public opinion. Examples are our chambers of commerce, boards of trade, real-estate boards, churches, women's clubs, parents' associations, labor unions, union-league clubs, bankers' associations, bar associations, credit-men's associations, accountants' clubs, and manufacturers' associations.

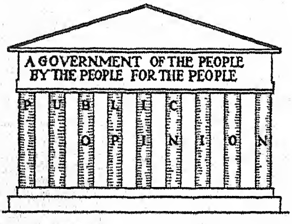
Each of us can help form public opinion. — All of these groups and many others like them work more or less steadily at forming public opinion upon the questions of the day. Some of these groups are futile; some are effective. Some are narrow and prejudiced; some are broadminded. There are all sorts and kinds. And of course, one group frequently opposes and contradicts another. The whole truth seldom or never is found in the sayings of any one group. We must be able to pick and choose.

One very good feature of this host of opinion-forming groups is the fact that each of us can find groups in which he can take an active part. We do not need to stand on the side lines and watch the game. We can be — and should be — among the players. And many of us are players. It has been estimated that in the city of New York alone there are six thousand organizations affecting public opinion. No one knows the total for the country as a whole, but it certainly runs into the scores of thousands.

Then, too, it is possible for individuals to help form public opinion without acting as members of a group. The editor of a newspaper, a writer, or a publisher can do so, for example. Society is so large and complex to-day, however, that individuals can usually be most effective in helping to form public opinion when they act in groups rather than alone.

Public opinion compared with custom and law. — These things may be said of public opinion as a part of our scheme of social control.

1. *It involves thinking and discussion.* — Control by public opinion is not the same thing as control by custom. Control by custom is "unthinking." We act as custom says without stopping to think about it at all. Real public opinion, however, comes after thinking and discussion and communication with others. It seems probable that man, the scientist and communicator, will gradually turn more and more to public opinion and less and less to custom as a means of social control.



PUBLIC OPINION IS THE SUPPORT OF POPULAR GOVERNMENT

2. *It supplements law.* — Public opinion is not as sharp and definite as law, but it is more quickly formed and is far less expensive. Often it is a first step in getting statute law. Far more often, however, it stops short of actual law and merely "puts pressure" on persons to act as it wishes. It is a good addition or supplement to law.

3. *Circumstances under which it works best.* — Clearly, public opinion will work best as a part of social control when the group is a thinking, educated group; when there are good channels of discussion and communication; and when there are good leaders of the discussion. Public opinion will be a better and safer means of control when "the public" understands what it means to live together and is open-minded to truth; when the press, the pulpit, and other channels of communication are entirely honest and fearless; when experts with good ideals lead the discussion. Expert guidance will become more and more important as

democracy develops more and more complex problems of living together. At this moment, it must be admitted, public opinion is too much influenced by custom and prejudice; too little influenced by expert knowledge.

D. The Sense of Divine Approval

(The part played by conscience and religion in social control.)

Since we have already discussed the church as a torch-bearer (see page 321), we need only mention here the fact that conscience and religion are powerful means of social control.

The inner voice of conscience controls. — Public opinion is often a changeable, fickle thing. Both it and law are mainly "outside pressures" brought to bear on us. But inside of each of us is "the still, small voice of conscience" talking to us in a rather unchanging way of right and wrong, — of honesty, loyalty, justice, duty, good faith, fair dealing. It tells us what we *ought* to do, no matter what public opinion or law or anything outside us may say. Just where our ideas of right and wrong come from would be hard for us to tell. Many of them are rooted deep in custom. Some are based on education and reason. Some are based on bad training, and are therefore poor ideas of right and wrong. Wherever they come from they control us mightily.

The power of religion as a means of social control. — Religion often adds a sense of divine approval to conscience. It thus gives a feeling that law or public opinion can never give. That is shown in our saying, "God sees what I do and knows what I think even if men do not." Religion, therefore, strikes deeper and is more personal and searching than most other forms of social control. Then, too, there is a sense of great power behind it. It makes us feel that God, the all-

powerful, is on the side of "right" and that, sooner or later, evil must be conquered. What a powerful means of social control religion is!

Problems

1. Define or explain:

Social control	Statute law	Following precedent
Custom	Judge-made law	Public opinion
The cake of custom	An enactment	Public judgment
Taboo	A bill	Conscience
Common Law	An ordinance	Political parties

2. Show that the family, the school, the trade-union, the business man's club, and the church are means or agencies of social control. Mention other agencies.

3. How do customary ways get established? Why is a society in which custom is strong an "unchanging" society? Why is social control by customary ways likely to be somewhat poor social control in a rapidly changing society?

4. "Custom is a thoroughly bad form of social control." Is that true? "One is always safe if he guides himself by the good old customs the race has built up." Is that true?

5. "A tremendous amount of our living together has its roots down in custom." Show that this is true.

6. "If a new idea opposes the customary thinking of the day, that idea will have a hard time getting widely accepted." Show why this is true. What is meant by saying that someone "is ahead of his times?"

7. If a man violates custom what will the penalty be? If he violates law what will the penalty be?

8. Custom was far more powerful among primitive people than it is to-day. Why? Is it likely to be more or less powerful in the future? Why?

9. In America there are millions of immigrants from various countries. What effect does this have upon our customs? Does it make them more changing, or less changing?

10. Give an example of customs that control us but have never been enacted into law.

11. "Common law has been approved by the group." How? By a vote? "Statute law has been approved by the group." How?

12. If a law becomes out of date, what can be done about it? Can it be repealed? Can it be left on the statute books, but not enforced? Which way would be more likely to increase our respect for law?

13. What is the main task of a legislature? Of a system of courts? Are courts torchbearers? Are legislatures?

14. "Law is ever-changing, ever-growing." Why should this be true?

15. Why is it important that we should have respect for law?

16. Give illustrations other than those in the text where the law says, "Thou shalt not"; where it says, "I'll help."

17. Why is public opinion a better device for social control when the people are educated? "The school is the cornerstone of democracy." What does this mean?

18. How does public opinion control you or me? Has it punishments? Has it rewards?

19. What have political parties to do with public opinion? What have they to do with government?

20. Mention some groups in your own town that help form public opinion. If your teacher approves, let each member of the class write to some such organization in which he is interested, and get its statement of purpose and the conditions of membership. Then compare your organization with others.

21. Ask several adult friends with what organizations they are associated. Find out why they joined: whether they do much in the organization.

22. I can mention several organizations that are trying to mold public opinion in a way I dislike. I think the "platforms" of these organizations are wrong. Nevertheless, I am glad they exist, much as I hope they will not succeed. How can that be true?

23. What did the writer mean who called such groups with their talk and discussions "educators of democracy"? What did he mean when he said they helped make possible our progress in good government?

24. Make a list of the various ways by which such groups may affect public opinion. Here is a start: (a) public debates, (b) advertisements in papers, (c) . . . etc.

25. Why are freedom of speech, freedom to form groups (called freedom of organization), and freedom of the press important to our society if we wish to live together well?

26. "Public opinion seems likely to become a more important means of social control as time goes on." Why? Why is it a better means today than it was five hundred years ago?

27. Do "great men" have much influence on public opinion? Did Washington? Name as many living persons as you can who are greatly influencing public opinion.

28. What are some of the things conscience tells us that are not touched by law? Is telling the truth one?

29. Answer the questions at the beginning of the chapter, page 421.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter XIV.

1. Some Early Forms of Social Control (myth, magic, fetishism, totemism, and taboo).
2. How Laws Are Made (a law traced from the days of forming public opinion to the governor's signature).
3. Dangers in Modern Industry (an example of social control in conserving our human resources).

See also:

Chapter II, 4. The Oeh-da, the Good Spirit and the Bad Spirit (an Iroquois myth of the creation).

Problems to think over are given in these reading selections.

CHAPTER XV

SOCIAL CONTROL: THE NATION AND GOVERNMENT

A. The Nation, a Multiplier of Man's Powers by Enlarging His Coöperation

B. Democracy, a Multiplier of Man's Powers by Developing the Individual

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Questions to Keep in Mind while Reading This Chapter

1. How did we come to have nations and governments?
2. Why is democracy called a multiplier of our powers?
3. What are the main problems confronting democracy?

This chapter continues the discussion of social control. — In the last chapter we examined some of our means of social control — customs, law, public opinion, conscience and religion. In this chapter, we are to continue the discussion of social control by examining the nation and government. These are our most important *political* institutions.

We are so accustomed to living in a world-society made up of nations and their governments that we seldom wonder how such things came to be. Of course, when we do stop to think of such matters, we realize that these political institutions, the nation and government, have probably had just as long, slow a development as private property has had or the church, or the school, or the law. That is precisely the case. In this chapter, we are to discuss how the simple groupings of primitive man expanded into nations with their governments; and how government has fallen more and more into the hands of all the people of a nation.

A. The Nation, a Multiplier of Man's Powers by Enlarging His Coöperation

(How we came to have nations; how government helps in living together.)

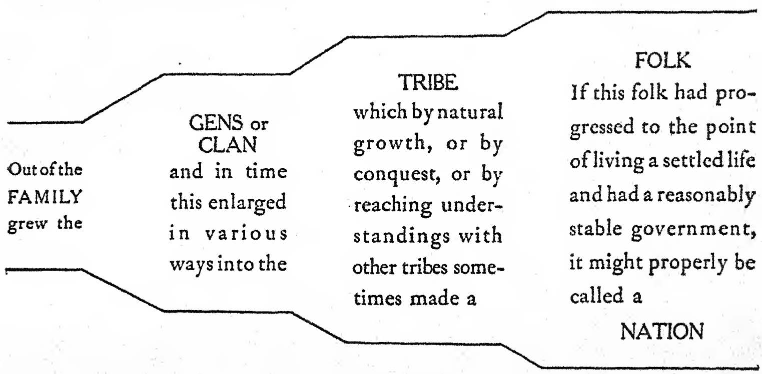
How, through the long centuries, did such groups as those of a few dozen miserable Neanderthal men change into nations with governments? As one would expect, it happened in no one rigid way. In different parts of the world there were somewhat different ways by which man expanded his groupings.

Sometimes nations and their governments have resulted mainly from conquest. — Quite likely the process of forming a "nation" with its "government" was often fairly simple, although it took a long time. Suppose that, in some spot, there was an early human group. This group would have subgroups, such as the men, the women, families, the warrior class, the old men, the children, etc. Naturally, there would be some persons who were more important (had more influence) than others. This would be true of the arrow maker, the story-teller, the medicine man, the successful warrior, or the wise old man of the group. Then, too, some subgroups, such as that of the old men, would have more influence than certain other subgroups. It is easy to think of these persons of influence as being a small bit — a very small bit — like our modern officials. It is also easy to think of the customs and taboos, etc., as being a small bit—a very small bit—like our modern laws.

Groups of early men were frequently at war with one another. When one group conquered another, the conquered people would be "ruled" either as individual slaves or as a subordinate group. If this process took place time after time (as it did through the long centuries) it is easy to see

how there could finally be a large and powerful group (let us call it a nation) in which there would be "rulers" and "ruled." This may be called the conquest theory of the rise of nations and governments.

Sometimes other causes helped in forming nations and governments. — We do not need to assume that conquest was the only cause of the development of nations and government. Very likely feelings of kinship, feelings that benefits came from the coöperation of larger groups, feelings of

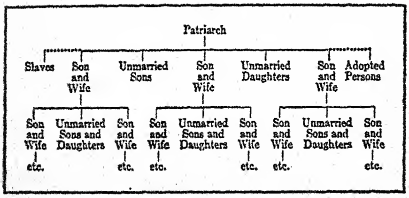


One Possible Way by Which Nations Were Formed

the need of having officials and rules to protect property rights, and other feelings helped to develop these important political institutions. In other words, there were probably cases where the above diagram will help us to understand what happened.

The early family could be a fairly large group with the beginnings of "government" and "officials." — We already know that the family is one of our very oldest institutions, — one of our very oldest social groups. It has had various forms at various times and among various peoples. If, however, we stride past all the earlier centuries and come at once

to neolithic times, we find that the patriarchal family is the form most frequently found. Let us, therefore, discuss only that form. This patriarchal family quite readily resulted in the formation of a fairly large group. At its head was the patriarch. When the sons married, they brought their wives home to live with the group, and their children of course increased its numbers. When the boys of this younger generation married, still other clusters were added to the home hive, and so it went. Then, too, these patriarchal families often picked up servants and slaves and adopted persons. When such a group prospered, its numbers could increase rapidly.



THE PATRIARCHAL FAMILY

Such a family made a very close, compact group. As we think of its members, we should be inclined to talk of brothers, nephews, cousins, cousins once removed, etc. To them, however, all kinship ties were felt to be very close. Among some peoples there was no such word as cousin. All were brothers or sisters, or at the most, nephews and nieces. Sometimes even servants would be treated as children of the family.

By force of custom, the patriarch was the ruler of the group, generally a rigid and often a despotic ruler. His word was law, his command was final. The coöperation of the group in tending their herds, making their tents, preparing their utensils, or fighting for access to drinking water was all done under his authority. He arranged the marriages of the sons, as when Abraham arranged for the marriage of Isaac with Rebekah in the Bible story. Among some peoples, he sold members of the family into slavery, or even

slew them if he thought it wise. If his group was a fairly large one, he might have his favorites act as assistant managers.

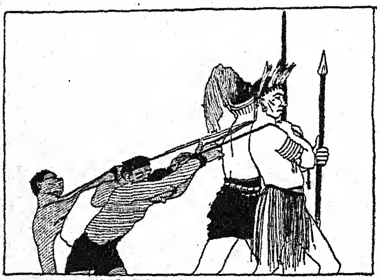
The next larger grouping was the gens. — In the days of the early patriarchal family, man was a poor harnesser of nature. Even the groups that had progressed most knew only the beginnings of agriculture, or of keeping domesticated animals. Because of man's meager ability to harness nature, there were but few spots on the earth where large patriarchal families could hold together and still have a good food supply. This was true even of those who led moderately settled lives. It was still more true of the nomadic families that moved about in search of pasture for their herds.

As a result, while there may have been some cases of a patriarchal family clinging together and becoming so large as to deserve the name of tribe, it was more usual for the large families to split up, and to send out offshoots of new patriarchal families from time to time. Naturally the feeling of kinship still continued after the split had occurred. The result was that the families of one kinship were united with one another in a way that we have come to call a gens, or clan.

Just how close this union of the different parts of a gens or clan would be depended upon many circumstances. If they were a fairly settled people, and especially if the food supply was large enough to enable them to settle near one another, it was easier to have a close kinship tie. If they were a roving people, and especially if scanty food caused them to wander far apart, it was harder to have a close tie. If there were enterprises in which coöperation gave needed strength (as in case of being raided by others, or in case of a desire to seize the rich territory of others), the gens held together more closely than when such enterprises were lacking.

Here, as in the rest of man's development, the ways that proved to be effective, through the long generations of trial and error, were the ways that became the customs of the people. And, as we know, customs, once formed, rule mightily.

The next larger grouping was the tribe with its "government" and "officials."—A clan or gens that was being held together fairly closely might form an even larger and more powerful group in various ways. One way would be by "natural increase," which means by children being born to the group. Another way would be by capturing individuals from other peoples during wars, raids, or wife-stealing expeditions. Another way would be by conquering a whole people and then taking them into the group either as equals or, more commonly, as inferiors and slaves. Another way would be for several gentes to unite because of some early blood-tie, or because of conquest, or because of agreement. There were thus various circumstances under which it was effective to have a group large enough to be called a tribe.


CAPTIVES – SPOILS OF WAR

As, through the long centuries, gentes were expanded or grouped into larger bodies called tribes, a certain amount of specialization of duties would take place within the group. There might well be a head chief or ruler for the whole tribe; there would be small chiefs in the clans; there would be medicine men or priests; there would be ways of organizing for wars and for the chase, for tilling the soil, and for other purposes. In other words, some framework of *government*

would slowly come into existence. This framework would have different details among different peoples. It would always be a part of the slowly developed customs of the people, and not something that had been carefully thought out or planned. Government, like our other social institutions, has its roots deep down in custom.

The next larger grouping was the folk. — To continue with our story. There were places and circumstances in which a group larger than an ordinary tribe would be formed. An ordinary tribe might grow larger through natural increase, or through adding individuals from time to time. Or it might conquer other tribes. Or several tribes, after generations of trial and error, might unite with one another in a fairly permanent way. For lack of a better term let us call such a large group a folk. Of course a folk would have a framework of government, and would have "officials."

Man's settling down made possible nations with fixed territories. — In some way or other, it frequently happened that early men enlarged their groups. We must now survey the story of man's groupings with his "settling down" process in mind. Early men were homeless wanderers who moved about in search of food. That continued to be true for a long time. It is true even to-day of quite a few peoples, — the desert nomads, for example.

When man was a poor harnesser of nature, there were but few spots on the earth where he could exist without wandering. Such spots would have to furnish food at all seasons (for he knew little of storing it); materials for making shelter; and supplies for his herds, if he had any. There were not many such places. Therefore, in the main, man wandered about for thousands of years without any marked signs of settling down. Then he spent still other thousands

of years fitfully wandering, settling, wandering, settling, wandering, and finally coming to rest.

Since that is true, we can see that under some circumstances our story of man's groupings would be a story of restless wanderers. In your history you will read of such cases. For example, you will learn of such terrible leaders as Attila the Hun, and of the even more terrible Genghis Khan, and their folk. You will see that barbarian folk swept down over the Roman Empire and destroyed it. History is full of restless migrations of tribes and folk.

On the other hand, you will read of cases where, thousands of years ago, tribes and folk settled down and, having settled, were able to build up a fairly good culture. That was the case in the fertile valley of the Nile; in the valley of the Euphrates and Tigris; and in the early "city-states" of Athens, Sparta, Carthage, and Rome. Such folk with fixed territories deserve the name of nation. Your study of history will show that we owe more to these early settled nations than we have had space to acknowledge properly in this book.

The essential features of a nation. We are now in a position to make a list of the main features of a nation. They are:

(1) a group of people (usually a fairly large number of like-minded people)

(2) living in a definite territory

(3) and having some definite framework of government

(4) which is administered by officials.

So also, we can now see the difference between a nation and its government. "Government" is by no means the same thing as "nation." Government is merely one device (an important one, of course) that a nation uses in getting its tasks done. It is the main political device of the nation.

The Iroquois, an illustration of a folk becoming a nation. — Thus far our story of man's expanding groupings has been told as a sketch of ways in which this expansion might have happened. Let us now look at an illustration.

Our account of the Iroquois showed us a people that, according to tradition, had long been wanderers. At the time the whites of Europe discovered them they were becoming a settled folk. True, they would wander off in groups, at appropriate seasons, for hunting or fishing. But their villages were likely to remain in one place for ten or fifteen years. They were settling down.

The League

Senecas	Oneidas	Cayugas	Mohawks	Onondagas
Wolf	Bear	Wolf	Bear	Wolf
Bear	Wolf	Bear	Wolf	Bear
Beaver	Turtle	Beaver	Turtle	Beaver
Deer		Deer		Deer
Snipe		Snipe		Snipe
Heron		Heron		Heron
Hawk		Hawk		Hawk
Turtle		Turtle		Turtle

They had never developed the strong patriarchal family, but they did have clans or gentes in the various tribes. Then, too, the tribes were grouped into a league and had, therefore, formed a folk. There was a certain amount of framework of government in the clan, in the village, in the tribe, and in the league. It is true that the league government operated only on occasions. A strong, firm nation had not yet been formed. In other words, the Iroquois were a group that had made use of the gens and tribe and were probably in the process of settling down and forming a nation.

The reason for man's expanding groupings and government. — Now that we have before us a sketch of how men expanded their groupings, let us ask *why*. Why did men not "run in pairs" with their younger children as some animals do? Why did they form great clusters?

Two reasons are usually given. The first is that man is by nature "social": that he has a "social instinct" causing

him to form groups, and to be miserable and unhappy when not in a group. That may be true. It certainly seems true of some insects and animals. Whether true of man or not, there is a second reason that could explain man's groupings. It is this. Through long centuries of trial and error, it was found that it worked best (and therefore became the custom) to gather into groups. Coöperation in groups made possible better hunting; it gave better protection from animals and from other groups of men. Coöperation through grouping was found to be a multiplier of man's powers. No one reasoned it out or planned it. It was just "felt" to work well.

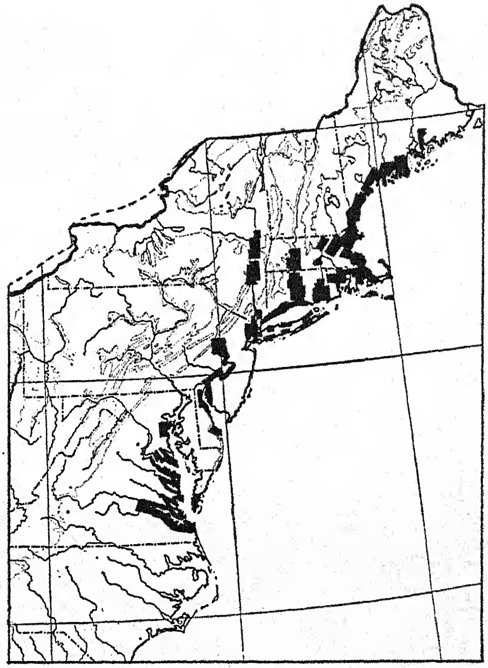
So also, it came about that a machinery developed for managing this enlarged coöperation, a machinery we now call government. At first the machinery was very simple, such as the customary rule of the important persons of the tribe or the patriarch. As time went on and the groups became larger, the machinery also became larger and more complex. To-day, we in the United States talk of the executive branch of government with its host of officials; the legislative, or law-making branch; and the judicial or law-applying branch. We have local government for smaller areas and national government for the nation as a whole. All this can be traced back to the earlier stages of man's progress.

The United States, an example of modern expanding groupings. — The account of the formation of nations and governments shows how man began to have such institutions. Once he had them, new nations and governments might be formed in other ways, especially by colonization.

Take our own case. As the map shows, about 1650 there were on our eastern coast scattered settlements. Some of the settlers had come in the hope of securing religious freedom; most of them came as a business venture. The mother country, England, claimed this land, and these settlers were

therefore really little hives that were still a part of the English nation and were under the English government.[1] For each hive there was some form of local government.

Let a century go by. During that hundred years more settlers have poured in. The hives have become more numerous. Partly as a result of their own actions and partly as a result of the actions of the mother country, these hives are grouped into colonies — the "thirteen original colonies," we call them. Each colony is a member of the British Empire.



THE AMERICAN COLONIES IN 1660

Notice how the settlements cling to the seashore and the navigable rivers.

Next, the mother country and these thirteen children get into a dispute. The thirteen children group themselves together and declare (1776) they are to be independent. They win their independence by the sword. During the war they are a "confederation." After the war they come to feel the need of a closer union. In 1787 they draw up a "constitution" for "The United States of America," — almost 4,000,000 people.

[1]Except for a Swedish and a Dutch settlement.

This new nation has as its territory a great belt of land stretching inward from the Atlantic coast. As time goes on, it adds to its territory by negotiation, by purchase, and by conquest. As for its people, they increase tremendously. Part of the increase is the result of an inpouring of 35,000,000 immigrants, most of them becoming members of this new nation. To-day the nation stretches from ocean to ocean (and out across the seas) and has 110,000,000 people in its borders under a form of government called a *republic.*

THE UNITED STATES OF 1783 IS SHOWN IN BLACK

Of course this sketch of the development of our nation has nothing in it that we did not already know. It is told merely to remind ourselves that to-day, just as in the past, man finds it worth while to make use of the nation and government in his coöperation.

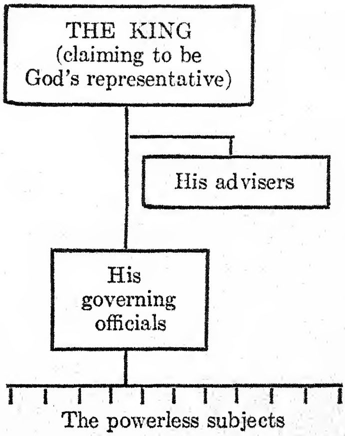
B. DEMOCRACY, A MULTIPLIER OF MAN'S POWERS BY DEVELOPING THE INDIVIDUAL

(Early despotic rule; what democracy is and how it won its way.)

"Man is a political animal," said an old Greek philosopher. So he is. He is also a tool-making animal, a communicating animal, a nature-harnessing animal, an institution-making animal; in short, he is the kind of animal that is ever busy in multiplying his powers. Since it multiplied his powers to expand his groupings into nations and to have governments, he did so. How he probably did it was sketched in the last section. As time went on, this political animal found that he could still further multiply his powers by using a device called *democracy.* This word *democracy* comes from two Greek words meaning "the rule of the

people." Our task in this section is to find out what "the rule of the people" means, and why it multiplies our powers.

Early nations were usually ruled in a harsh way. — Our sketch of man's expanding groupings showed that war and conquest played quite a part in the formation of early nations. That usually meant that some strong leader secured and held a great deal of power. In those days it did not shock people for the ruler to have great power. Such an idea was in their minds (thanks to custom) from the still earlier days of the harsh, despotic rule of the patriarch. Since such things were true, it is not surprising that earlier nations (with only a few exceptions) came to be ruled in a despotic way. They were not ruled by the ordinary people. Far from it.



Of course, just how government was carried on varied from nation to nation, and from time to time. We can get a fair picture of the process, however, by taking a snapshot of one of the early states of western civilization that was ruled by a despotic king.

The position of the ruler. — As the diagram shows, the king was at the head of the nation. Frequently, he or one of his ancestors had been the leader of a tribe that had conquered other tribes, most of whose members were now slaves or half free. He was likely to have some kind of advisory body, or council (selected mainly from his band of warriors), whose advice he heeded or disregarded as seemed to him best or safest. Since there were many details in the task of

running a nation, he had under him a group of officials to carry out his wishes. Some were leaders in his army, others were tax collectors, others were judges, others were sheriffs to keep the peace, and others managed his finances. All were "his." They took orders from him and from no one else — from the common people least of all.

Such a king ruled by force of the hold of custom on men's minds and by might, — the might of the sword, the arrow, and the lance. He and his mail-clad warriors could, if occasion arose, ride almost unharmed through a host of the ignorant and poorly-armed common people. Then too, the idea gradually developed that he was God's representative on earth. Every king was glad to encourage this idea. It added the authority of religion to the authority of the sword, and thus made him more secure on his throne. In time, the doctrine of "the divine right of kings" became widely accepted. "The king can do no wrong," it was said, even though he sometimes acted far more like a representative of the devil than of God.

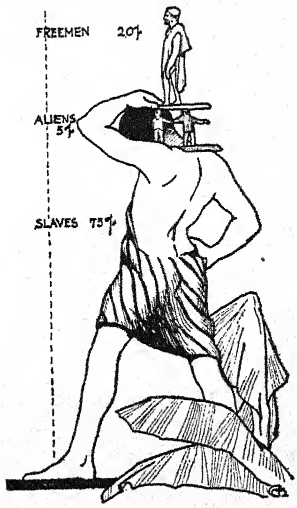
Courtesy of La Croix, Manners and Customs, (Chapman and Hall, Ltd.)

MAIL-CLAD WARRIORS

The bulk of the population was not free. — As for his lower-class subjects, some were free men (especially the artisans and traders of the towns) but more were half free (they were called *villeins* in England), and in some states the bulk of the population were slaves. For example, a survey of England made less than a thousand years ago (1086) showed that there were about seven times as many slaves and half-free men as there were free men. The figures were even worse in many other early states. Whether slave, half free, or free, the lot of the common man in an early nation was none too

good. He could not read nor write and his "betters" frowned upon such accomplishments for him. He was gripped by custom, blinded by superstition, and beset by fears of both this world and the next. It has been said of him that "his mind barely worked."

The "rights" of the ordinary man. — It is true that he had, according to custom, a certain number of "rights." But if the king chose to trample down his grain during a hunt or even to seize his property, there was really very little he could do about it. If the king or his officers threw him into prison (some pretext could easily be found), the chances were excellent that he would rot there, for who would get him out? Who would even get a trial for him? And prison always yawned for the common man. If he did not agree with the king's brand of religion, if he gathered with others to talk of the king's doings, if he criticized the king or his government, if he was suspected of having arms, he was very likely to bring down upon himself the king's wrath. That wrath might well mean sudden and brutal searching of his home, arbitrary seizure, imprisonment without trial, and cruel punishment.



THE ATHENIAN POPULATION

Even so, the situation was better than what preceded it. — All this seems to us a terrible state of affairs. It certainly was. However, we must not forget that it was better than the still earlier conditions; it was a forward step in human progress. After all, the king could not wisely go too far. Even

WHAT OUR CONSTITUTION SAYS OF CIVIL RIGHTS

Our constitution is about 140 years old. It was thought wise to insert these clauses. What a short time we have been safe in our civil rights!

Congress shall make no law respecting the establishment of religion or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble.

The right of the people to bear arms shall not be infringed. The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures shall not be violated.

No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentiment or indictment of a grand jury; nor shall any person be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty or property without due process of law.

In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial by an impartial jury.

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

No state shall deny to any person within its jurisdiction the equal protection of the laws.

The privilege of the writ of *habeas corpus* (this provides for finding out whether an accused person may properly be held), shall not be suspended unless when in case of rebellion or invasion the public safety may require it.

No bill of attainder (sentence on an accused by act of legislature instead of using a court trial) or *ex post facto* law (providing punishment for acts done prior to passing the law) shall be passed.

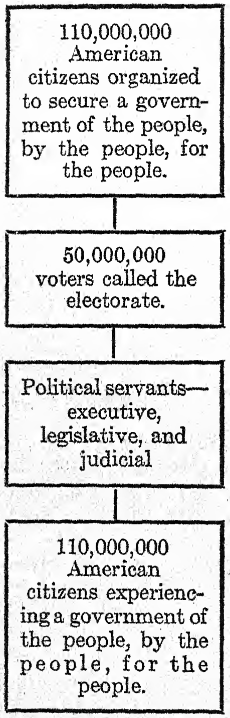
when he had no fear of revolt (and he often had that fear), he would be foolish to cripple too seriously the industry of his people, for that would cripple his own living. Then, too, the arbitrary rule of a warrior king was better than a chaos of helter-skelter raiding and pillage among warring tribes. It was a beginning of real order. It meant the coöperation of a large group. On the average, men were safer in their lives and property, and were better fed, clothed, and sheltered than they were in the days of the wandering tribes.

Occasionally, too, there would be a king who used his great power to help the progress of his people. To take a case outside our western nations, there was Asoka (264-227 B.C.) of India. "He seems to have ruled his vast empire in peace and with great ability. He organized a great digging of wells in India and the planting of trees for shade. His officers supervised charitable works. He founded hospitals and public gardens. He made provision for the education of his people, including the women. For twenty-eight years he worked sanely for the real needs of men. From the Volga to Japan his name is still honored."[1] To him his great power became his great opportunity to serve others.

Democracy is a better plan than rule by a despot. — But there were very, very few kings like Asoka. There were, accordingly, few cases where despotic rule worked well. Despotic power over his fellow men was not good even for the monarch: almost always he became selfish and cruel. It was not good for the people. It was bad that their ordinary human rights (as we think) were not respected. It was worse that they had no feeling of responsibility for the affairs of their country, no individual initiative in helping to make a better country. As we look back over the pages of history, we see a better form of government slowly emerge.

[1]Adapted from Wells, *The Outline of History*, 1, 431. (The Macmillan Co.)

It is democracy, the rule of the people. The great thing about democracy, the rule of the people, is that it makes everyone responsible for the affairs of his country. It develops the individual's power and initiative in getting an ever better country.

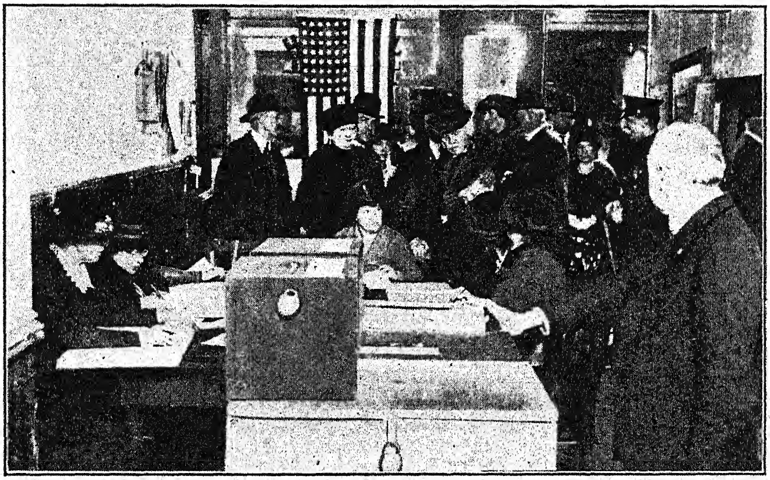


Citizens rule for the good of all. — The diagram shows the main features of democracy in our country. There is no arbitrary ruler at the head of the nation. There are 110,000,000 free American citizen rulers. "All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States, and of the State wherein they reside" says our national constitution. That great document further says that the purpose these citizens have in being banded together in a government is "to form a more perfect union, establish justice, insure domestic tranquility, provide for the common defense, promote the general welfare, and secure the blessings of liberty." Stirring words, surely, and well worth committing to memory. How strange they would have seemed to an early despotic ruler, mindful mainly of his own welfare and caring little for that of the people!

What the electorate is, and who form it. — Every one of these citizens who can do anything at all can take some part in the government of the nation. Even a child can help a street cleaner or a policeman, for example. But about one

half of our citizens[1] (about 50,000,000) have an especially important part in the government. They are the ones who, under our rules of the game, have the right to vote, or to elect our public servants. We call them the *electorate.*

The various states (Ohio, California, Florida, etc.) say who may vote, or be in the electorate. Our national consti-



A SCENE AT A VOTING PLACE

The election officials and the ballot boxes are in the foreground. Voters are waiting in lines.

tution merely provides that "the right of citizens to vote shall not be limited on account of sex, race, color, or previous condition of servitude." Most states have forbidden minors to vote because of a minor's lack of knowledge; they have forbidden criminals, because criminals have shown they are not coöperative; they have forbidden foreigners, because foreigners lack interest in our affairs. Some states have made other limitations.

[1]A few persons have the right to vote although they are not citizens.

Government officials are the citizens' servants. — As shown by the diagram on page 468, the electorate selects our public servants. This selection is made in various ways, and with many devices and safeguards. Then these servants, using a good deal of clattering governmental machinery, set about the task of taking care of the affairs of the people. We are not now concerned with all the details of how it is done or how well it is done, for we do not wish to become confused by the noise of the machinery. A very simple idea is behind it all. In a democracy the government is just a device used by the people to carry on their coöperation effectively. The officials of a democracy do not "rule"; they merely serve the people. They carry out the wishes of the people according to plans approved by the people.

How the people came to rule. — When we compare the diagrams on pages 463 and 468, we see that on page 463 the common man is powerless and on page 468 he is a ruler. How did such a great change come about? The whole story cannot be told here. It is too long, and its telling belongs in history courses. But I can give you a sketch of what happened.

Through the long centuries, democracy (remember democracy means the rule of the people) found that she had three ways[1] by which she could gradually climb into power. (1) She could dicker and bargain for power. The king was always greedy for money and was nearly always willing to sell "privileges," that through the years came to be regarded as "rights." (2) She could fight for power. Some of the most inspiring happenings in history are the battles between the people and arbitrary rulers. (3) Her artists, writers, painters, sculptors, and philosophers could hold up ideals and aspirations that strengthened her followers and helped persuade even her enemies.

[1]Tufts, *The Real Business of Living*. (Henry Holt and Co.)

Her climb was a long one and a hard one. It meant hundreds of steps. We can look back and see these steps running in long series or flights. Here is one possible list of these series:

1. The people had to become free in their persons. Slavery and serfdom had to disappear.

2. The people had to become free in their minds. The rule of the people would do more harm than good unless the people were able to think and plan.

3. The people had to get the right to be ruled by law rather than by the whim of a ruler.

DEMOCRACY, GUIDED BY KNOWLEDGE AND IDEALS, FIGHTS AND BUYS HER WAY INTO POWER

4. The people had to win freedom of speech and freedom to have property and rights in property (page 413).

5. The people had to get the right to be heard in framing and running the government.

6. The people had to turn this right to be heard into a right actually to frame and run the government. Officials then became the servants of the people.

7. The people had to enlarge the number who could be members of the electorate. (Even after the American

Revolution only about one person in thirty could vote in this country.)

8. The people had to learn how to guide and control their public servants.

9. The people had to find out the right things to do in a government of the people, by the people, for the people.

Many tasks still before democracy. — We must not imagine that the tasks of democracy have all been finished. Far from it. Her problems to-day are quite as serious as those of the past. There is no reason to suppose that they will be any less serious in the future. Man is always pressing on — always "becoming," one writer has said — and the conditions of his living are ever changing. There will always be problems of social control for democracy to solve.

How can democracy control her public servants? — As just one sample of democracy's present day problems, let us look at the problem (see number 8 above) of the effective guidance and control of our public servants. We wish to be sure that our public servants carry out our wishes and that they do so in an economical and effective manner. We expect this of all our servants — policeman, mayor, alderman, teacher, governor, legislator, judge, jailer, president, congressman, and all the rest. It is no simple problem. Here are some of the more important things that have to be watched.

1. *Citizens must themselves have good ideals of public service*, so that they will not tolerate poor service. There is an old saying, "A stream will not rise higher than its source." We need not expect that our citizen servants will have any better ideals than the citizen masters. Unfortunately we Americans have not yet developed very high ideals of public service. We are loose and careless about the matter. This is one of our very serious problems.

2. *Citizens must see to it that good servants are selected.* — In the case of servants who are elected, we must see that the electorate has good methods of selecting candidates, fair methods of balloting, and ways of having the candidates pledge themselves to serve well. In the case of servants who are appointed, we must have ways, such as are sketched in 5, below, to cause the persons who make the appointments to be careful to appoint good servants.

3. *Citizens must provide a body of rules to govern the acts of their servants.* — Our national and state constitutions and some of our laws supply such rules. For example, on page 466, there is a statement of some of the things our servants may not do. Of course, as conditions change, these rules — these constitutions and laws — need to be amended from time to time.

4. *Citizens must have ways of knowing what their servants are doing.* — Because we wish to know what our servants are doing we have annual reports by our public officers. We have public (not secret) meetings of our legislatures and courts and we have official records of what goes on in these legislatures and courts. We have access to public records. So also, we like to have easy access to our servants (we are often a nuisance to our governors and presidents and interfere sadly with public work), and we encourage private bodies like city clubs and bureaus of municipal research (see page 444) to tell us how public affairs are being carried on.

5. *Citizens must have ways of holding public servants accountable for their acts.* — For this purpose we have impeachment devices designed to remove judges and executives who fail grossly in carrying out our rules. We have laws providing for punishment in our courts for certain misdeeds of our servants. We have ways of telling our servants

by letters, petitions, resolutions, and remonstrances what we think of their acts (see page 442). And, of course, we can always refuse to re-elect or re-appoint those who serve us poorly.

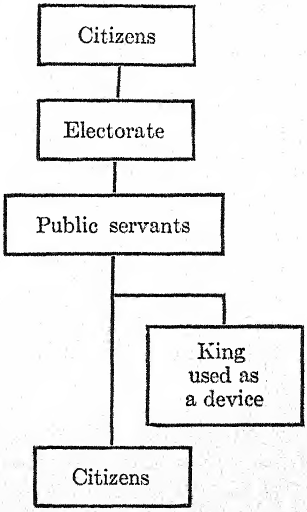
In the last generation certain other devices have come to be used in about one third of our states. The "referendum" provides that certain acts (especially laws) of the public servants must be "referred" to the electorate for a vote before becoming effective. The "recall" means that the electorate may vote to recall an unsatisfactory public servant, thus putting him out of office before his term has expired. The "initiative" provides how legislation may be initiated, or started, by the electorate itself without waiting for action by the elected servants. There is still much dispute whether these new devices are wise and, if wise, how they should be used. We do not need to go into the merits of the case. We need merely to understand that they are illustrations of the ways by which democracy is trying to have good control of her servants.

Let us bear in mind that this discussion of how democracy keeps control of her servants shows only *one example* of the many, many problems confronting democracy to-day. We can see that democracy has not yet fully "arrived"; it is just "becoming."

The position of democracy to-day. — We have taken most of our illustrations from our own democracy, but we must not suppose that ours is the only possible form of democracy. Even a nation with a king may really be a democracy! Take the case of England to-day. England has a king, but he is a figurehead. He is merely a device used in the government. The people rule. The diagram showing how it is done is quite like the diagram of our own organization on page 468. The main difference is that in the English

diagram shown below the king is inserted as a convenient way (for them) to get certain things done.

It is amazing how democracy has swept over the world. Two thousand years ago — yes, two hundred years ago — there was little rule by the people. Even in the most advanced countries, democracy was just fighting its way to the front. To-day more than half of the peoples of the world live in democracies; a mere handful are still the subjects of arbitrary kings; the rest are in various transition stages.



Political institutions can be multipliers of men's powers. — Now that we have made our survey of two political institutions, the nation and government, let us make a summary of the main reasons why they are multipliers of our powers.

1. The nation multiplies man's powers because it enables him to have a larger group in which to work out his coöperation. In some real sense, the strength of *all* of us is available for the use of *each* of us. One device that helps greatly to make this vast strength available for each of us is government. It is a political device that helps knit together the specialists of our society. It is a device that helps us conduct our many activities in an orderly way. It thus increases our ability to make progress.

2. There are many kinds or forms of government. Some are better than others. Man is coming to rely more and more upon those forms of government that use "the rule

of the people." The reason is plain. Democracy, with all its crudeness and faults, is a multiplier of man's powers. It places responsibility upon every individual. It thus develops his initiative and gives him pride of achievement. It rests upon the faith that men can rise to their opportunities, if they will only pay the price of hard work and careful thinking.

Problems

1. Define or explain, using a dictionary if necessary:

Political institutions	Impeachment
Government	Writ of *habeas corpus*
Initiative	Constitution
Referendum	Electorate
Recall	Republic

2. "Government has not yet arrived. It is merely becoming. That will always be true." What does this mean? Is it true of all social institutions? Why should we wish it to be true?

3. Why did the patriarchal family make possible a fairly large group?

4. Do you think that men reasoned matters out in the long ago past and, persuaded by reason, came together and formed nations and governments?

5. How did abundant food supply and shelter affect the groupings of early man? How did they affect the "settling down" process?

6. "There is so little slavery to-day that we seldom hear of it and almost never reflect that it was once the usual thing." Why was slavery once so usual?

7. Notice the essential features of a nation as given on page 458. Does the United States meet the requirements?

8. "The Iroquois were just on the point of being a nation." "The Iroquois had become a nation." With which quotation do you agree? Why?

9. "Man increases his powers by expanding his coöperation." Give reasons why that increases his powers. Write a paragraph telling why man has found it worth while to expand his groupings into nations.

10. What are the main points of difference between the way our nation was formed and the way the earliest nations were formed?

11. Why does democracy increase individual initiative?

12. "The lot of the common man was none too good in the typical early nation." What was the matter with his lot?

13. The first ten amendments to our constitution are called our "bill of rights for the ordinary citizen." Show that is a good name. (Most of the material on page 466 comes from these ten amendments.)

14. "Government by the early arbitrary king was a step in human progress." How can arbitrary government be considered a step in progress?

15. Children are citizens, although not members of the electorate. Make as long a list as you can of things children can do to assist in government. Can they be witnesses in a court trial? Can they assist city officials?

16. What differences do you see between the officials of an early king and those of a democracy?

17. Look at the flights of steps (pages 471 and 472) that democracy has climbed, or is still climbing. Explain why each flight must be passed before there can be true democracy.

18. "Citizens must have good ideals of public service." Why?

19. Are you a member of any club? Does it have a set of regulations for your servants, the officers of the club? Are there ways of knowing what your servants are doing? Of holding them accountable? How do you determine what the club should do? Notice numbers 6, 8, and 9 on pages 471 and 472.

20. "Citizens must have ways of knowing what their servants are doing." What are some of these ways? Find out from your family how they learn what their city servants are doing.

21. "Citizens must have ways of holding their servants accountable for their acts." What are some of these ways? Find out from your family how they hold their local servants accountable.

22. "Democracy will never arrive. It will always be arriving." What does this mean?

23. Notice again the numbers on pages 471 and 472. Under which heading does each of the following come? Do not try to say what should be done in each case. Be content with being able to see what is being attempted in some of the plans of our day:

(a) The recall of judges
(b) Easier ways of amending constitutions
(c) The short ballot
(d) The budget
(e) Electing judges rather than having them appointed.

24. Answer the questions at the beginning of the chapter, page 451.

INTERESTING READING

Marshall: *Readings in the Story of Human Progress*, Chapter XV.

1. The United States Department of Agriculture (an example of the work of one national executive department).
2. What a State Does (a partial list of the ways in which the state touches our lives).
3. The City Water Supply (how a city performs one of its tasks).
4. Lighting a City (how a city performs another task).

See also:

Chapter IV, 3. Inventions and Patents (what the government does to encourage inventions).

Chapter V, 3. Our Measuring Devices or Standards (how standards help us: the work of the Bureau of Standards).

Chapter IX, 2. Coins (the origin of coins; how our coins are made and are kept in good condition).

Chapter IX, 3. Paper Money (how our paper money is made and kept in good condition).

Chapter XI, 2. Good Roads (a realm of communication in which we have recently made much progress).

Chapter XI, 3. The United States Post Office (one way the government aids in developing communication to-day).

Chapter XIV, 2. How Laws Are Made (a law traced from the days of forming public opinion to the governor's signature).

Chapter XIV, 3. Dangers in Modern Industry (an example of social control in conserving our human resources).

Chapter XVI, 1. Improving Our Market Machinery (one example of how we improve the knitting together of our specialists).

Chapter XVI, 2. Vocational Guidance (how one city school system handles this work).

Problems to think over are given in these reading selections.

CHAPTER XVI

SOCIAL ORGANIZATION AND LIVING TOGETHER WELL

A. Specialization and Living Together Well
B. Place-finding Devices and Living Together Well
C. The Team Spirit and Living Together Well
D. Planning a Changing Social Organization and Living Together Well
E. Guidance by Ideals and Aspirations

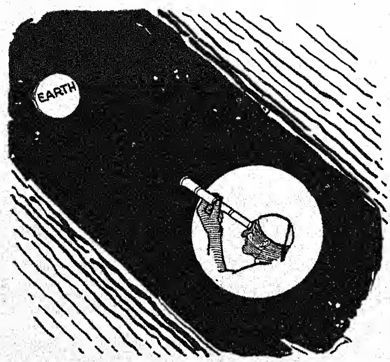
Questions to Keep in Mind while Reading This Chapter

1. What things in our social organization threaten our living together well?
2. Why is it so important to have good social control?
3. Will any of our social institutions change in our life time?

What is social organization? — The last few chapters have shown that man is an institution-maker just as truly as he is a tool-maker. He has developed all sorts of institutions. In Part III we studied such institutions as the family, the church, the school, and the monetary system. In Part IV we have been examining, among others, the market system, private property, competition, law, and government. These are, of course, only a few examples of our more important institutions. But they are enough to show that good ways of organizing to do things are quite as important as good tools to do things with.

These institutions fit into one another more or less smoothly. Taken together, they make up that complex thing we call our social organization.

When we think of any ordinary machine, we think of its being guided or run by someone who turns on the power and supervises the work. But if we call this social organization of ours, with all its institutions, a vast machine for getting done the work of living together, we cannot point to anyone who runs it. True, we select our representatives to run the governmental part of it. But the rest of it is run by everybody's finding his place and helping pull the load. This "works" because, through the ages, our torchbearers have handed down to all of us much the same customs and ideas and ideals. As a result, we are able to live and work together fairly smoothly.



Our social organization works in a fairly orderly way. — And this social organization really does work. If a "man on Mars" is able to watch us through some magic telescope, he sees a very orderly people, coöperating very smoothly upon the whole. He sees them come out of their homes in the morning and wend their ways by all sorts of locomotion to thousands of different kinds of work. He sees these tasks all knitted together in such a way that, in the main, the vast population is decently fed, clothed, sheltered, amused, educated, and governed.

There are, of course, hitches. Sometimes there are too many vehicles on one street, too many persons trying to get on one train, too many persons not able to find their places readily in society. Sometimes some great madness, as in the recent world war, seems to possess us. Sometimes persons

make a living by harming society: by burglary, by political graft, by cheating in business. But this "man on Mars" sees that the strange machine does get things done. And, if he happens to have been watching us for five hundred or one thousand years, he sees that we are far better fed, clothed, sheltered, amused, educated, and governed than we were in the past. He sees too, that our institutions have developed out of those of the past in a fairly orderly, progressive way.[1]

But we must face certain problems. — If, however, this man on Mars turned his magic telescope on our preparation to live together still better in the future, he would find many things that need attention. Instead of making a long list of "problems of the day," let us follow the plan used in Chapters VI and XI and make additions to our list of matters upon which our living together well in the future depends.

Thus far we have been able to make nine statements about our living together well. They may be found on pages 180 and 333.

Now that we have seen how man has multiplied his powers by means of social organization, we can make additions to the list. These additions are the subject matter of the present chapter.

10. How well we shall live together depends upon whether we make effective use of specialization as a multiplier of our powers, and upon whether we knit our specialists together effectively.

11. How well we shall live together depends upon the effectiveness of our place-finding devices.

12. How well we shall live together depends upon our developing an effective spirit in pulling the load.

13. How well we shall live together depends upon whether we make wise changes in our social organization in order to meet the new situations in our civilization.

14. How well we shall live together depends upon whether we guide our social organization by good ideals and aspirations.

[1] Adapted from Edwin Cannan, *Wealth*, pp. 72-76 (P. S. King and Son, Ltd., 1914).

A. Specialization and Living Together Well

(How well we shall live together depends upon whether we make effective use of specialization as a multiplier of our powers, and whether we knit our specialists together effectively.)

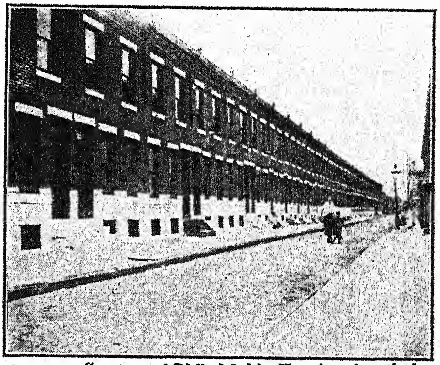
There are evils in specialization. — We have learned to think of specialization as a multiplier of our powers. It is just that. But it has in it possibilities of harm.

The monotony of specialization. — For one thing, specialization can mean a terrible monotony. Often the worker at a highly specialized machine makes, over and over again, just a few motions. This monotonous working at a narrow task turns out much product, but its effect on the worker is not good. He has little chance to get the "pride of workmanship" that anyone feels who sees an object take full shape under his hands. He becomes indifferent, — a listener for the closing whistle. There have been cases where the monotonous doing of one thing over and over again even caused the breakdown of nerve centers and serious injury to health. A little later we shall talk of "sour indifference" among our workers. The dull monotony of highly specialized work is partly to blame for this sour attitude.

The narrowness of specialization. — For another thing specialization can mean a terrible narrowness. Consider the case of Carrington Tanner, who went directly from the eighth grade to a highly specialized job in a factory. All he did was to stand beside a moving platform and thrust a certain set of bolts into place as a metal casting passed him. What did he learn that would be helpful in giving him promotion to some responsible task in management? What did he learn that would make him a good "all-'round" mechanic? Nothing. One of the crying needs of industry to-day is the broadly trained man who can adjust himself quickly to new

situations and can take responsibility. But narrow specialization does not produce such men.

Specialization at its worst can be as narrowing to a whole community as it can be to an individual. Sometimes the whole life of a community is wrapped up in the making of one thing. The narrow, monotonous lives of people in such districts are often harmful to others as well as to themselves. Such people become narrow or "provincial" in their thinking. They become unable to understand clearly the problems of other districts. This means that they are not as helpful members of a democracy as they should be, for in a democracy one district often votes on matters that are very important for other districts.



Courtesy of Philadelphia Housing Association

MONOTONOUS LIVING QUARTERS FOR WORKERS AT MONOTONOUS TASKS

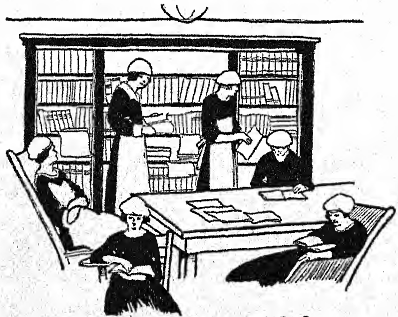
It is possible to offset the evils of specialization. — Of course, the fact that there can be some bad effects of specialization does not necessarily mean that we should cease to use it. It is a good device when rightly used. But we must be careful to offset its evils.

One way to offset the narrowing effects of specialization is for all of us to remain in school long enough to get a broad education before going out to our specialized tasks. Various ways can be found to relieve those of us who are already at tasks that are monotonous and narrowing. Frequent rest periods, reasonable hours of work, and wholesome recreation greatly offset the evils of monotony. Contact with broaden-

ing influences at the theater, library, or elsewhere during leisure time will help us to avoid narrowness.

A campaign against the evils of specialization can thus make good use of the school system, the recreation center, the movies, the public library, the shorter workday, and many, many other features of our society.

We must make certain our specialists are knitted together effectively. — Even after we have found ways to offset the evils of specialization, we need to have our specialists knitted together effectively. We know from Chapter XII that knitting together is done by authority and through exchange. To the extent to which it is done by authority, our problem is one of securing ever-better social organization and control. That is to be discussed later in pages 498 to 507. To the extent to which it is done through exchange, our problem is one of developing more effective marketing methods. "Marketing" is a very large topic, indeed. We do not need to discuss it here. It is enough for us to know that both our business men and our governments are striving to find ever-better ways of marketing. They are making all sorts of studies and all sorts of experiments. They are seeking to find ways of knitting together our specialists with as little waste of society's energy as possible.



FACTORY REST ROOM FOR GIRLS

How well we shall live together depends upon whether we make good use of the multiplier of our powers, specialization. We shall need to offset its evils, and we shall need to knit our specialists together more effectively.

B. Place-finding Devices and Living Together Well

(How well we shall live together depends upon the effectiveness of our place-finding devices.)

The importance of place-finding devices is very great. — Upon the whole, our scheme of leaving it to the individual to find the "right" place for himself and his property (see pages 400 to 412) is a good scheme. It spurs each of us on to make a success in life and to give good service to society. We are all working in coöperation with one another. All of us fare best when all of us are in our "right" places and are pulling hard at the load.

Since that is true, one would suppose that our society would have many devices, or helpers, to give each of us the best possible chance of finding his right place. There are some such helpers, but they are absurdly few and poor for such an important matter. One critic says, "We turn people loose blindfolded and tell them to find their places. They fumble around and, like as not, are square pegs in round holes all their lives. What an awful waste of our human resources! What an effective way of harming ourselves!" Perhaps that criticism is a little too strong, but certainly we are not doing all we should be doing to help persons find their places.

What is done to help the individual find his place?—Let us take some samples of what is being done in this field. In our more progressive schools courses are given explaining the duties of the main occupations and pointing out how to prepare for them. Some school systems have a "vocational counselor" or "placement officer," who aids pupils to find out about the tasks of our society and who "follows up" the work of graduates and former students. A few schools have schemes by which pupils may "try out" jobs in their senior

year and thus learn at first hand what is required for each kind of work. Less helpful, but still very much worth having, are assembly talks by lawyers, doctors, merchants, and others concerning their work and how to prepare for it.

WANTED—MALE HELP.

Employment Agencies.

SALES AND GENL. MGR., Constr. and Elec. Equip ....$10,000-$15,000.00
SALESMEN [10], no exper.; prefer clean cut Northern type, 25-35 yrs. ....$3,000-$6,000.00
SALESMEN [3], food exper., calling on retail trade ....$2,400-$3,600.00
SALESMEN [2], wholesale groc exper., calling on job. trade; road. Ex. plus $2,400
SALESMEN [20], Dyes, Paper, Auto Tires, Retail Furniture, Hardware, Advg., Photo Eng., Soap, etc ....$150-$300.00
SALESMAN, to sell from truck, high grade soaps ....Comm. and $150.00

TECHNICAL DEPT.

ASSAYER, gold and silver, exper. ....$150-$200.00
CHEMISTS [3], college grad., no exp. necessary $125.00
PHYSICAL CHEMISTS, exper. in mfg. processes ....$175-$200.00
DRAFTSMAN, exper. Structural, Ornamental ....$30.00 up
DENTAL MECHANICS, must be exper. ....$40.00 up
MAP DRAFTSMAN, 1st class letterer, bring samples $175.00

CLERICAL DEPT.

ACCT.-BKKPR., A1 man $2,400.00
STENO., refined, snappy, aggressive chap, to assume charge of office employing 8 girls. To start $130.00
INSURANCE CLERKS, all capacities ....$70.00-$200.00
COUNTER MAN, Ins. Office..........$125.00
YOUNG MAN, refined type, to handle coll. page in bank $90.00
JR. CLERK, knowledge typing, for high grade office, near Loop $110.00
HIGH SCHOOL GRAD, or College trained man for clerical position that will lead to sales $100.00
TIMEKEEPERS [2], 23-40 years; mfg. concerns ....$25-$30.00
COST CLERK, exceptional oppor. to become asst. plant supt. later $130.00
STOCK RECORD CLERK, Loop concern $100.00
BANK, Pay and Rec. Teller $160.00
BANK, Clearing House Clerk $100.00
BANK, Burroughs Bkkpr $100.00
BANK, young men and boys, to learn banking ....$60-$90.00
RAILROAD, Typist, to work second trick $130.00
R. R. Biller $145.00
R. R. CLERKS, no exper. required ....$90.00-$100.00
BOYS! BOYS! BOYS! We have nearly 200 positions for boys of good family, with the best Chicago firms and banks ....$60-$75.00

If we haven't listed above the job you are seeking come in and tell us and you can rest assured of our heartiest co-operation in seeing that you are placed satisfactorily. Call early.

Employment System,

Out in industry, firms advertise for help at the factory gate and in the newspapers. The United States Government and some states and cities run free employment exchanges that bring worker and job together. Private persons also run employment exchanges. For a fee they find workers for employers and employers for workers. There are other institutions that merely spread information concerning occupations. Several private bureaus publish reports telling of opportunities in various work.

How small the activities mentioned in the last two paragraphs are!

What is done to help the owner of property find its place?—So also, there are some devices to help the owner of property find the "right" places for his property to go to work. Our various governments maintain a few of these devices. For example, the Consular Service of the National Government publishes reports of openings for American capital and for the sale of American goods in foreign lands. Various states have bureaus telling of opportunities for settling on public lands. Many cities have agencies for giving information (sometimes it is

misinformation) of business opportunities in these cities, hoping thus to build up their communities.

In addition to governmental agencies, there are private agencies. There are hundreds of "trade journals," most of which print news of conditions in their trade. Many banks print and distribute bulletins about business conditions. Sometimes these give hints of business opportunities. Every large newspaper has, on its financial page, news and gossip of conditions in various businesses. Bond houses will give advice concerning investments. The trend of prices of stocks will sometimes show the skilled observer that certain lines of business are profitable and that others are not. There are engineering firms which, for a fee, will investigate and report concerning possible business ventures.

LAND INFORMATION.

Profits in Colorado Lands.

At present low prices for good Colorado lands, real farmers can make substantial returns on investment and effort dairying, raising poultry, hogs and a variety of crops. We can tell you about choice locations in irrigated and dry land sections. Our service and literature free. Board of Immigration. State office Bldg., Denver, Colorado.

OWN A MICHIGAN FARM ON CERTIFIED land for free reliable information on colonization, certified lands, accredited dealers soils crops and climate write Director, Agricultural Industry Mich. State Dept. of Agr., 8 State Bldg., Lansing, Mich.

MINNESOTA OFFERS OPPORTUNITIES TO farmers send for free map and literature. O. H. Smith, Commissioner of Immigration, Dept 750 State Capitol St. Paul Minn.

BUSINESS OPPORTUNITIES

Names and addresses corresponding to these opportunities may be secured by writing the trade department of the Chicago Association of Commerce, giving specific number in which you are interested, either telephoning in your request or sending in self-addressed, stamped envelope.

2,588—Gibsland, La., wants buckles.
2,589—Parsons, Tenn., wants pianos.
2,590—Dodge City, Kas., wants tags.
2,591—Ranger, Tex., wants wheels.
2,592—Milan, Italy, wants to represent Chicago trade..
2,593—Barcelona, Spain, wants meat casings.
2,594—Rio de Janeiro, Brazil, wants to represent Chicago trade.
2,595—Chicago firm wants post cards.
2,596—Bogota, Colombia, wants steel wires, pencils, rubbers, and pens.
2,597—Tientsin, China, wants to represent Chicago trade.
2,598—Berlin, Germany, wants to represent Chicago trade.
2,599—Grescenzago, Italy, in the market for bristles and fiber.
2,600—San Francisco, Cal., wants to represent Chicago trade.
2,601—El Paso, Tex., is in the market for sewing machines.
2,602—Kansas City, Mo., wants to represent Chicago trade.

But all that has thus far been done to help the individual find the right place for his property is a mere beginning. We must do much more.

What can be done to help the individual find his place?—Probably the best way to help the individual find his place is to extend the work of our schools, colleges, and universities in this field. The merest beginning has been made in training persons to serve as vocational counselors in the schools. The merest beginning has been made in studying the kinds of tasks in

society and the best preparation for them. The merest beginning has been made in putting such facts before pupils and parents and in helping them to learn of the various forms of society's work. All this is a proper task of our educational system. Our society is too complex for the family to be able to handle the task well. The church is not equipped to do it. The school, of all our institutions, can do it best. Our schools will need more money to enable them to accomplish this task. But it will be a good investment for society if the task is well done. It will mean much for our living together well.

Probably the next best way to help the individual find his place is for our large employers, such as business houses and government bureaus, to enlarge their departments or bureaus that deal with the workers. These departments are often called "personnel departments." A well-managed personnel department can greatly shorten the period of "fumbling around" by the worker. By various tests it can make a fair judgment of the worker's skill and ability at the time he applies for work. It can thus help to start him at a task for which he is well fitted. By careful schemes of training and promotion, it can help his development after he is at work. It ought to be said, too, that a good system of public employment agencies run on a country-wide basis so that every employment office could know of opportunities all over the country, might coöperate with both schools and business houses in finding the right places for our specialists.

What can be done to help the owner of property find its place? — The problem of helping the owner of property to find its right place is a more difficult one to solve. Clearly the problem is worthy of attention, for society loses when capital goods — buildings, machinery, and materials — are not used in the right tasks.

It is easy to see some things that can be done. Our state governments can watch more carefully to see that "fake" and fraudulent enterprises are not allowed to ask citizens for funds, and to see that proper enterprises tell the whole truth when they seek funds. Several states are already working in this direction in their "blue-sky laws," which regulate the efforts of business houses to secure funds. Then, too, our various government bureaus can go much farther than they have gone in making known facts about the demand for goods, shortage of goods, the surplus of goods, what amounts other nations can produce, etc. And our schools can show pupils what devices society already has for helping get property into the right places, and how these devices can be used.

Courtesy of Selfridge and Company

WE MUST SHOW THE INDIVIDUAL HIS OPPORTUNITY

Some persons think that greater publicity should be given to the profits being made in the different lines of business. They argue that since we depend upon the gain spirit to place our competitors, we ought to make sure that these competitors know in what lines of business gains are being made. They say we are already moving in that direction; that anyone can, for a fee, get such business houses as Dun's or Bradstreet's (who specialize in making reports about firms)

to find out fairly accurately what profits are being made in certain lines of business; that our banks get such information from persons who come to them to borrow money; that the government has the information in the income tax reports; that it would be possible to publish helpful general reports about profits in different *lines* of business without betraying any secrets of a given firm.

The problem of helping property find its "right" place is not an easy one. We cannot solve it on a page. We can only see its outlines. But we can be quite certain that a society which asks its competitors to place their property according to the promptings of the gain spirit is foolish not to find good ways of providing these competitors with facts upon which to work. Only thus can society be well served.

We must remove the blindfolds. — How well we shall live together depends upon the effectiveness of our place-finding devices. We cannot expect individual initiative, competition, the gain spirit, and private property to work best when our specialists are blindfolded.

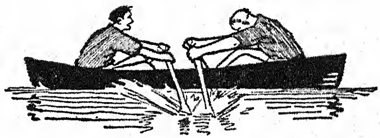
C. The Team Spirit and Living Together Well

(How well we shall live together depends upon our developing an effective spirit in pulling the load.)

A few years ago a football team of a middle western college started its season with excellent prospects. It had won the championship of its section the year before; its best players had all returned; there was excellent material among the substitutes. But, for various reasons, petty jealousies broke out in the team. Each player came to feel that the others were shirking and were getting more honor and credit than they deserved. The spirit of "teamwork" — of "all-pull-together" — disappeared. The result was that this team lost every game except one with a ridiculously weak opponent.

Distrust and jealousy are marring our teamwork. — Now a football team is really a collection of specialists working together. Each player has certain duties, and these duties should fit together in team play. Exactly the same thing is true of our society of specialists. There should be a spirit of "teamwork" — of "all-pull-together" — if society is to get the best results from the work of its specialists. Unfortunately, there has developed in our society a great deal of "sour indifference" about pulling together in good teamwork.

We see examples of this in every newspaper. We hear examples of it in many conversations of adults. Farmers think that city people work short hours and get high wages as compared with the low prices the farmer gets for his products. The employer often thinks that the worker shirks and gets paid more than he is worth. The worker replies that the employer "profiteers"; that he squeezes work out of labor at low pay and sells the product at high prices. The producer often thinks that he gets the "short end" of the bargain because the middleman charges more than his marketing work is worth. The consumer often thinks that he is "fleeced" by both the producer and the middleman. The average man often thinks the "cards are stacked" against him in favor of the "big fellow," who has some monopoly or some "political pull." Such expressions as "grafter," "profiteer," "tax dodger," "robber," "monopolist," "protected criminal," "unfair competition," "grab," and "he got his, let's get ours" are heard on every side.



POOR TEAMWORK

These are only a few examples of the many that might be given showing that our team play is poor. Since the conflicts

between the worker and the employer are the most noticeable cases of lack of teamwork, let us hear what is said by these two parts of our society.

An example of distrust by the worker.—Here is what one person,[1] who thinks labor is being "double-crossed," says about the situation.

You are a workingman. You know how hard it is for the most careful and industrious workman properly to care for his family. If he is fortunate enough never to be sick, or out of work, or on strike, or to be involved in an accident, or to have sickness in his family, he may become the owner of a cheap home, or, by dint of much sacrifice, his children may be educated and enabled to enter one of the professions. He may be enabled to save enough to provide for himself and wife a pittance to keep them from pauperism and beggary in their old age.

To attain that level of comfort and decency he must deny himself and his wife and children many things they ought to enjoy. They have to forego many innocent pleasures; to live in poor streets, greatly to the disadvantage of the children's health and morals; to concentrate their energies on the narrow and sordid aim of saving money; to cultivate the instincts and feelings of the miser.

The horses in the stables of the rich men of this country, and the dogs in their kennels are protected against such overwork and such anxiety as the workingman and the workingman's wife must endure. Greater care is taken of the health of many horses and dogs than the most favored workingman can possibly take of the health of his boys and girls.

An example of distrust by a small manufacturer.—I showed the foregoing quotation to a small manufacturer. Here is what he said:

Our friend is not fair in his statements. The workingman can rise in America. Most of our business men, statesmen, and professional men have thus risen. Take my own case. I began by selling goods behind a counter. I have had no pull, no special favors, no property but what I have earned, and I have earned that honestly. True, I am only a "little fellow" and probably that is all I ever shall be, for my ability is not great. Just the same, I, and thousands like me, are evidence that America is still a land of opportunity for the person with thrift and industry.

[1]Adapted by permission from John Spargo, *The Common Sense of Socialism*, pp. 5–7. (Charles H. Kerr & Co.)

Furthermore, our friend doesn't know the other side of the picture. I have had my own slowly growing business for twenty years and not a year has passed without burdens, anxiety, sleepless nights, and hours of work far in excess of those of a workingman. Don't talk to me of my being free from toil and anxiety, or of my being able to live in luxury.

As far as that goes, one of my main reasons for anxiety is that one can't get his money's worth out of the wages he pays these days. Wages keep climbing up, the unions keep asking shorter hours, and the workers are more careless and less industrious than they once were.

It is only fair to say, though, that others cause trouble too. I notice that some of my competitors get away with tricky, shoddy work. Too many people seem to be grabbing rather than rendering good service, these days.

What are the causes of such faulty teamwork? — There is neither time nor space to give similar quotations from the farmer, the consumer, the middleman, the producer, the large manufacturer, or other specialists of our society. The fact that such quotations are very easy to get shows that our teamwork is being marred by jealousies, suspicions, and accusations. What can be done about it?

The first thing to do is to find the causes of this distrust. When we know these causes we can judge what remedies will work well. The main causes are:

1. We do not yet understand our teamwork. Consequently we sometimes make a botch of it.

2. Some cheap, selfish persons keep stirring up suspicions and jealousies.

3. There are in our social organization real evils that continue to cause sour feelings.

1. **We do not yet understand our teamwork, consequently we sometimes make a botch of it.** — No matter how willing and earnest a green player on a football team may be, he spoils the plays until he learns exactly what they are and what his part is in each play. The same thing is true of the specialists in our society. Now, as we have seen, many features of

society's teamwork are very recent, very rapidly changing, and therefore not well understood by all. Our specialization itself is new and changing; our marketing methods of knitting together our specialists are new and changing; many of our rules of the game are new and changing. It is, then, no great wonder that we often bump into one another and no great wonder that we sometimes think the other fellow is not playing the game as he should. If we really understood what he was trying to do and what his difficulties were, we would probably be more patient with him and have more respect for him.

If we can only fully realize that our living together to-day is a gigantic piece of teamwork, we shall come to have more respect for our team mates. Worker, manager, farmer, city dweller, capitalist, professional man, and all the others will come to feel more like taking off their hats to one another than throwing bricks. We are all working at one task, — that of living together in organized society. The work of each of us is difficult and worthy of respect.

2. **Some cheap, selfish persons keep stirring up suspicions and jealousies.** — In some of our trade unions, cheap labor politicians sometimes keep in office and keep "soft jobs" by telling the workers they are oppressed and the politician will try to save them. In some of our employers' associations cheap agitators sometimes get and hold jobs by continually crying that workers are radicals and that capital is in danger. In some of our cities cheap politicians sometimes get votes by "whanging the big drum" and shouting that the rural districts are voting against the city's best interests in the state legislature. These are merely three examples of hundreds of such cases in our society. They are old, old, contemptible tricks, but somehow they still work.

Probably it is useless to hope that such selfish persons will

reform and cease their harmful work. Probably the only way around the difficulty is for the rest of us to learn enough about our society to be able to distinguish unselfish leadership from selfish leadership. We certainly want our leaders to show us any dangers they see. We certainly do not want them to stir up distrust and suspicion merely as a means of keeping in office. Fortunately, most of them are of a good type. It is an old saying, however, that even one mad dog can bite many.

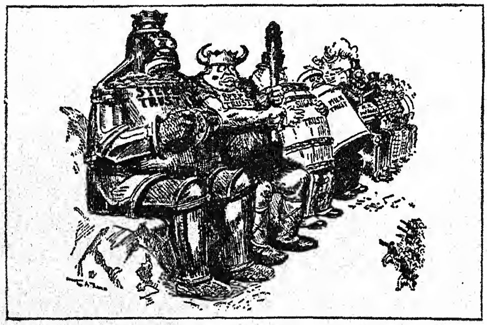
3. **There are in our social organization real evils that continue to cause sour feelings.**—The most serious cause of distrust and jealousies among our specialists to-day is the fact that very real evils do exist in our society.

Monotonous work and poor living conditions. — For one thing, our modern, large-scale, highly specialized industry has meant for some persons dull, monotonous conditions of work that "sear the soul of a man" and make him sour at almost everything. This has often gone hand in hand with poor living conditions that increase the sourness. Furthermore, our free education, plentiful printing, movies, and whatnot, contrast such unsatisfactory ways of working and living with more pleasant conditions enjoyed by others. Even if these unfortunates were themselves entirely to blame for their condition (and they are not always to blame) they could hardly help feeling restless and envious.

Trusts and monopolies. — For another thing, we have too blindly worshipped competition. Competition is really very useful. But in large sections of our living together, trusts and monopolies have taken its place. Often that is what we should wish. We wish it, for example, in our public utilities, such as the telephone, the street car, and the railroad. Where we have made our mistake is that in some cases we have gone on pretending there was competition when there was

really monopoly. Then, when we did not regulate and control this monopoly, its owners made large monopoly profits. Very naturally, the rest of us began to suspect a lack of fair play. One of our serious problems is the proper control of trusts and monopolies so that the rest of us can have more faith that our individual initiative has a fair field for its work.

Uncontrolled gain spirit. — This monopoly evil is really just a special case of a whole group of evils that have sprung up because we have not properly controlled the gain spirit. We have seen, many times, that this gain spirit is a useful device. But like most other useful devices it can be used either for good purposes or for evil purposes. It has too often been used for evil purposes.



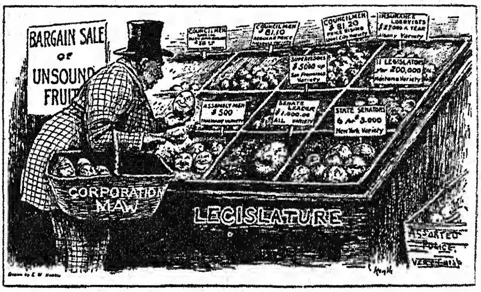
Courtesy of the Herald (New York) and the Review of Reviews Co.

A Cartoonist's Statement of How Weak the Individual Is Compared with Monopolies

You will remember that the idea behind our use of the gain spirit was this: the gain spirit would spur us on, and we would so arrange the rules of the game that a person would make gains only provided he served society. We haven't succeeded in so arranging the rules of the game. Shrewd men have found many ways to make gains without rendering service. They form monopolies and charge monopoly prices. They destroy carloads of potatoes so that the price of the remainder will be higher. They spread rumors that a certain business is in poor condition; buy its stocks at a low price; spread rumors that its condition has improved; and sell the

stocks at a profit. They let a highway get into bad shape (and even make it bad) and charge a tourist high prices for pulling his automobile out of the mire. These are only examples of thousands of filthy tricks, large and small, by which gains are made without serving. Such gains are seen by others. They arouse distrusts, jealousies, and suspicions.

It is not merely in the business world that we have failed to make the best use of the gain spirit. We have failed also in other parts of our living. Greedy politicians have paid large sums of public money to themselves and to their grafting friends for little or no service. Some judges and police officers have taken bribes and given "protection" to vice and criminals. Some aldermen have taken bribes to vote for awarding fat contracts in street paving to the briber. Senators and representatives have sometimes voted to expend public money in ways that would give gains to them or to their bribers. The handling of our governmental affairs by our representatives ought to be clean. Too often it has been and is filthy.



Courtesy of Collier's (New York) and the Review of Reviews Co.
A CARTOON OF PUBLIC SERVANTS BEING BOUGHT

Two things that would help remove these evils. — There is no easy cure for such evils. If, however, the following things could be done, we should have made great progress:

1. We ought to be made to understand that when one gains by harming society, he harms every one of us. As a result of his actions there are fewer good things of life and

more distrust and jealousy to mar our teamwork. When we really understand this, we shall become indignant. We shall not tolerate such acts.

2. When we become thus indignant, we shall use our schools, our press, our pulpits, and all our other torchbearers to build up sound public opinion. This public opinion will say that individual initiative, the gain spirit, private property, and competition are good devices and should continue to be used. It will also say that those who misuse them are traitors to society who must be snubbed, boycotted, and, if need be, put in jail. It will also say that honesty, the desire to serve, and honor are far more worth while than the dollar.

In other words, there is ahead of us the task of building up *good ideals* and *good social control* to meet the evils that are nibbling away our coöperative spirit. We must undertake this task, for how well we shall live together depends upon our developing an effective coöperative spirit in pulling the load.

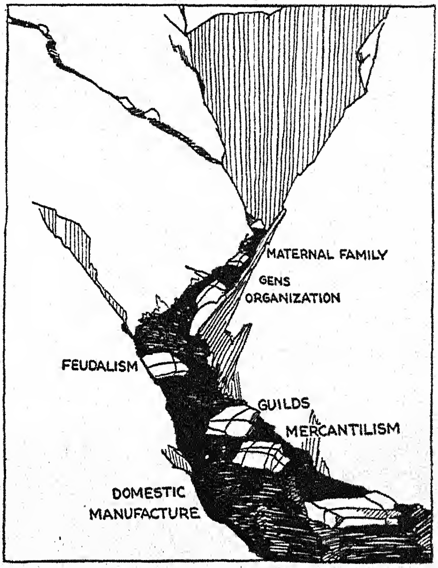
D. Planning a Changing Social Organization and Living Together Well

(How well we shall live together depends upon whether we make wise changes in our social organization in order to meet the new situations in our civilization.)

As we have seen, there are many parts — many institutions — in our social organization. We have also seen that a good social organization is very much worth while because it is a multiplier of man's powers. What shall we expect of the future of our social organization? Will it have a form that will aid in living together well?

Social organization is ever changing. — Our complex social organization is a changing thing. It is all the time adding new parts and discarding old ones. As it stands to-day, some

of its parts are very old. That is true of custom, government, the family, religion, and private property, for example. Others of its parts, such as our banking institutions, democracy, and our public schools, are fairly new. If we had time to take a journey down through the past, we should find the path cluttered with institutions that ceased to be used after they had ceased to meet the needs of changing conditions. You have heard the names of some of them: gilds, domestic manufacture, maternal family, and feudalism. If we could look into the future, we should certainly see new institutions being added while some of those we have to-day are being changed and even thrown away.



Outworn Institutions along the Path of the Past

The heat of new ideals and ideas should be applied gradually. — Since change in our institutions is as certain as the rising of to-morrow's sun, it is worth while to get a sensible attitude toward those changes. Take the job of cleaning an ordinary drinking glass. If one suddenly pours boiling water into a cold glass the result is likely to be a broken glass. The heat suddenly expands the inner surface of the glass, while the outer surface holds firm. A strain is developed, and if the strain is severe enough, the glass breaks.

There is no need of having such a break. If one begins with warm water and gradually increases the heat to the boiling point, the glass will be saved. There will be time for the heat to spread through the glass and expand the outer surface enough to relieve the strain. Boiling water, properly applied, does not break a glass. It is the foolish sudden use of boiling water that sets up a strain and causes a break.

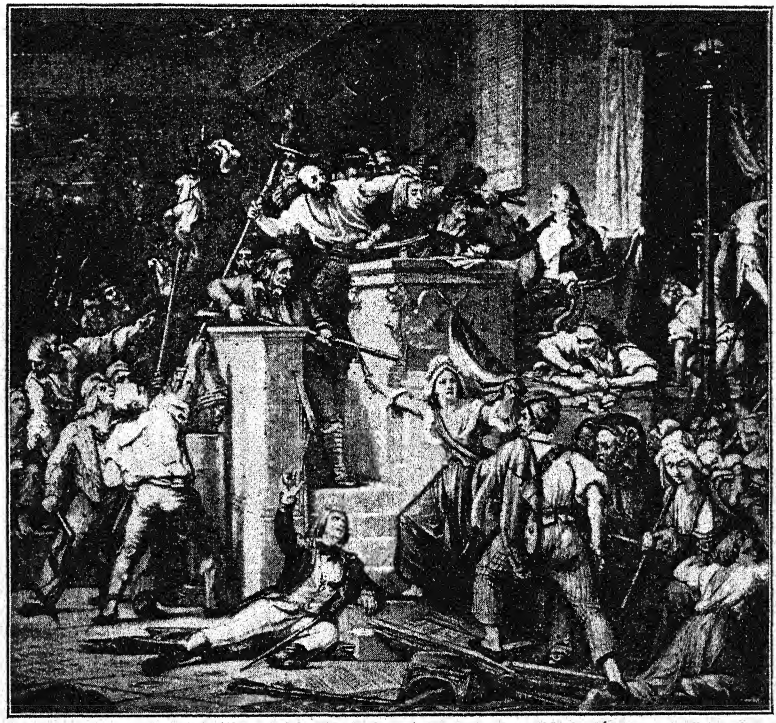
We have ahead of us a problem very like this case of cleaning a drinking glass. The "drinking glass, society," needs cleaning, but we ought to use care in the cleaning. The outer surface of this glass is a fairly rigid mass of customs, beliefs, laws, and institutions. There are present, for example, private property, competition, certain ideals of family life, contract law, and a host of others. Although these institutions are fairly rigid, they can change. They can expand if a little time is given for the heat of the new ideals and new ideas to penetrate them. Let us, then, apply the heat of our ideals and ideas gradually. It is better to clean slowly than to have a shattered glass.

And, after all, the cleaning does not have to be overslow. It is true that in the past some of our institutions have changed quite slowly. The growth of the number of "things" and "rights" (see page 412) in the bundle of private property, for example, took centuries. But those were the days of slowly changing customs. To-day, changes are much more rapid.

The glass was once broken in France. — The possibility of a shattered glass is a real possibility. Many times and among many peoples, the framework of society has been shattered, and a long period of picking up the pieces and framing a new society had to be endured.

One such case was the French Revolution of 1789. The French nation of that time was full of evils and oppression.

Arbitrary government, heavy taxation, depressed industry, terrible poverty, and brutal treatment of the ordinary man were the results of the long rule of the aristocrats. The glass needed cleaning. But those controlling the institutions that



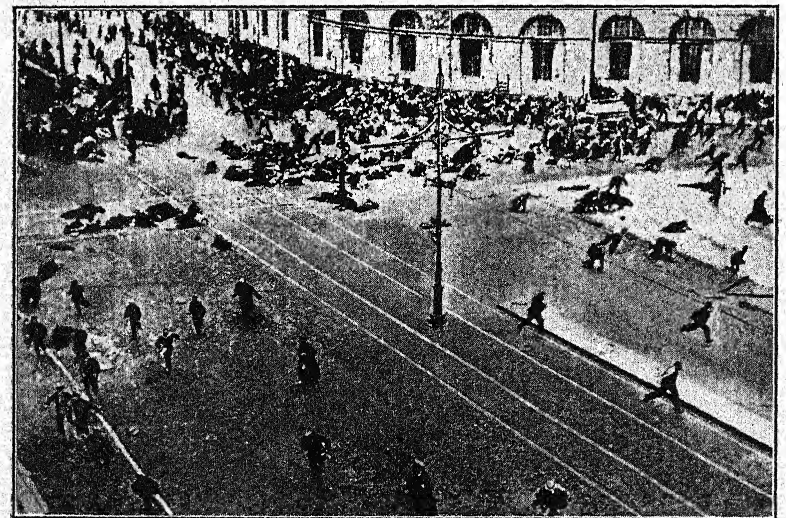
A Scene from the French Revolution
Rioters are in the convention hall demanding food.

made up the outer surface refused to let them expand. The oppressed lost patience; and hot ideas of "liberty, equality, and fraternity" broke the glass. There followed scenes of bloodshed so terrible that the period is called "the reign of terror." The craze that swept over the minds of the people

is illustrated by the fact that women took their knitting to the places of execution and put a knot in the knitting as each head fell into the basket of the guillotine. The craze of the revolution was followed by the dictatorship of Napoleon, and not until after 1815 did Europe begin to breathe regularly again.

Now, in the main, we believe that the ideas behind this revolution were sound ideas. We are glad they triumphed. Our regret is that the stubbornness and selfishness of the ruling classes, together with the hot impatience of the reformers, caused the change to be made in such a cruel, wasteful way. The framework of the society *could* have been expanded gradually without undue strain. Instead, the break was brought on. It was a risky and perilous way of making progress.

The glass was broken in Russia. — Another case very like this is found in Europe to-day. In the Russia of 1917 the glass



A Scene from the Russian Revolution

In this unusual picture the people in the streets are being slaughtered by machine guns located on the roof of the building shown.

needed cleaning. The autocratic rule of the Czar and the aristocrats had brought about evils like those in the France of an earlier century. Here, also, the outer surface was held rigid. Here, also, hot unrest would not wait. The result was a shattering of the framework of Russian society, with horrors worse than those of the French Revolution. The whole truth of what happened is not known. But it is known that thousands were executed; industry was disrupted; millions met death by starvation. We hope that, as in the case of France, the shattered pieces can be framed into a successful society. But it is too early yet to be sure. All we can be sure of is that such a break is a wasteful, risky, and perilous way of making progress. Man, after all these thousands of years, ought to have sense enough to find a better way.

How shall we make satisfactory progress? — Let us return to the cleaning of our own glass. It needs cleaning. How can we clean it without shattering it? Three things are needed.

1. *We should not resist all change.* — Let us not resist gradual expansion of the outer surface of the glass, if it can be shown that this expansion will be in the service of society. Fortunately, we have no ruling classes such as were the curse of France and Russia. Our officials are our servants. Unfortunately, we do have some stubborn persons who think, or pretend to think, that our institutions are permanent and unchanging and that anyone who talks of changing them is a sort of traitor to society. That, of course, is such nonsense that it does not deserve a word in reply. All human progress shows it to be nonsense.

There are others who fear that if change gets started it will go too far. They fear that private property will be wiped out, competition abandoned, capital destroyed, expert opinion disregarded, madness enthroned. There is no good ground for such fear. Such extremes are sought by but a handful

who have failed to understand what multipliers of our powers have meant for human progress. The best way to discredit this handful is to stand ready and eager to modify our institutions whenever it can be shown that the change will help clean the glass — will be of service to society.

In other words the first needed thing is this: Let us be open-minded and fearless about changes, asking only that it be shown that they will result in progress. *One of the most dangerous members of our society to-day is the person who resists all change.* He is helping to cause a strain that may result in a break.

2. *We should not expect too rapid change.* — Let those of us who wish changes made learn a lesson from the story of human progress. It is in the nature of the case that customs and laws and institutions change somewhat slowly. We know how our customs (which are fairly rigid) are handed on by our torchbearers. We know how our laws and institutions and ways of thinking have their roots down deep in these customs. (See page 430.) Let us give a little time for the heat of our new ideas and ideals to penetrate to the outer surface of the glass. No vital change that we could bring about would work well in a democracy unless the great mass of people had studied it, tested it, and made it a part of their thinking. Even in these bustling days we should not try to remake our institutions overnight. *Another of the most dangerous members of our society to-day is the harebrained "reformer" who wants society at once to leap through any hoop he happens to pick up.* He is helping to cause a strain that may result in a break.

3. *We should make our changes in orderly ways.* — Let us all bear in mind one enormous difference between our case and that of former France and Russia. We have in the very framework of our society provision for making needed

changes according to the will of the people. If our federal and state constitutions need to be changed, there are in those very documents rules for making amendments. If some of our common law has outlived its usefulness, the legislature can remedy that by passing statute law. (See page 435.) If the position of the worker is too insecure, there is an orderly machinery for providing workingmen's insurance, minimum wage, employment agencies, and what not. (See page 356.) If the gain spirit and competition and private property are failing to serve man and to multiply his powers as they should, there are orderly ways of making them do their duty. If our ideals have gone wrong, there are orderly ways of educating us to better ideals. (See Chapter XVII.)

> The Congress, whenever two thirds of both Houses shall deem it necessary, shall propose Amendments to this Constitution, or, on the Application of the Legislatures of two thirds of the several States, shall call a Convention for proposing Amendments, which, in either Case, shall be valid to all Intents and Purposes as Part of this Constitution, when ratified by the Legislatures of three fourths of the several States, or by Conventions in three fourths thereof, as the one or the other Mode of Ratification may be proposed by the Congress

HOW OUR NATIONAL CONSTITUTION MAY BE AMENDED

VARIOUS UNDESIRABLE CITIZENS BAR THE PATH OF PROGRESS

Of course, the orderly way is not always an easy way and it is not always a quick way. One difficulty is that we — even the reformers — are too lazy to undertake the hard study necessary to understand our social organization. It is far easier to *talk* of evils than it is to *think* out ways of removing the

evils without harming the rest of the organization. Another difficulty is that there really are forces which somewhat block the orderly way. The trust magnate tries to avoid being controlled; the grafting politician tries to prevent getting a better machinery of government; the lazy or stupid citizen hates to take the trouble to think about our living together well.

1897	Child Labor Law enacted.
1897	Certain Safety Devices required.
1901	Child Labor Law strengthened.
1903	Child Labor Law improved.
1907	Factory Inspection Bureau set up.
1907	Safety and Industrial Health Law.
1907	Safety on construction work required.
1908	State Examination of miners.
1909	Women's hours limited in some trades.
1910	Safety work in coal mines.
1911	Further limiting of women's hours.
1911	Protection from occupational diseases.
1913	Improvement of Coal Miners' Laws.
1913	Workingmen's Compensation Law.

FIFTEEN YEARS OF LEGISLATION CONCERNING WORKERS IN ONE STATE

This shows that improvement can take place at a fairly rapid rate. It ought to be noticed, too, that some states have moved forward even more rapidly and that it is harder to make changes in our law than in some of our other institutions.

But, after all, if our hot ideals and ideas are "right," reasonably good ways exist for carrying out the will of the people in an orderly way, and these ways can be made even better. *Another of the most dangerous members of our society to-day is the fellow who is unwilling to use our orderly ways of making changes*. It is far wiser to use them than to build up a strain that may cause a break.

In this whole matter of change in our social organization, we have great hope of the future. It is true that our social sciences are not as well developed as our other sciences. (See page 157.) But it is also true that we are making rapid progress in building up our economics, political science, sociology, geography, and history. We see ahead of us, if only dimly, the time when we shall cease to depend so much upon mere custom. We expect to stop "fumbling around"; we expect to get scientific rules of action in dealing with our social institutions. We expect to rely less and less on age-

long practices and customs; and more and more upon intelligent public opinion and scientific knowledge.

For the present, we might wisely be like the Greek philosopher Plato, of whom Emerson wrote: "One would say he had read the inscription on the gates of Busyrane, — *Be bold;* and on the second gate, — *Be bold, be bold, and evermore be bold;* and then had paused well at the third gate, — *Be not too bold.*"

E. Guidance by Ideals and Aspirations

(How well we shall live together depends upon whether we guide our social organization by good ideals and aspirations.)

There is no doubt that in social organization man has found another multiplier of his powers. Effective plans and ways of doing things are quite as important as tools to do them with. Specialization, the gain spirit, private property, government, law, and the other matters we have studied in Part IV, are as important as fire, the metals, power, machines, transportation devices, and all the other tangible, physical things discussed in Parts II and III.

That is all true. And it is equally true that all these devices may be used for either evil living or good living. Multiplication of powers may result in multiplied harm, or in multiplied benefits.

If our social organization is to result in better living together, we shall need to be guided by ideals and aspirations. In the first place, each one of us will need to be guided by his own personal ideals and aspirations concerning his proper part in our society. In the second place, the whole society will need to fix its eyes upon some goal or goals. There will be need of both *individual* and *group* ideals and aspirations.

Just what that means for our living together will form the subject matter of Part V.

Problems

1. Define or explain

(a) Social organization	(e) Trade journal
(b) The monotony of specialization	(f) Personnel department
(c) The narrowness of specialization	(g) Blue-sky laws
(d) Provincial thinking	(h) Monopoly profits

2. "Our society is one of order, not of chaos." What does this mean? Is it true?

3. Give illustrations other than those in the text of monotony of work because of specialization. If you do not know of any cases yourself, ask the older members of your family. Do the same with respect to narrowness because of specialization.

4. Why is it important in a society of specialists that each of us should find his "right" place? Does that mean that there is just *one* right place for you, or could there be a good many?

5. "We turn people loose blindfolded and tell them to find their places." Suppose you were to start to-day hunting your place. Are you blindfolded? Are there helpers to whom you can turn?

6. Give illustrations other than those in the text of means for helping the individual find his place. If you do not know of any yourself, ask the older members of your family. Do the same with respect to means for helping to find the right place for property.

7. Talk with others to see if you can learn of any business house that is managing its personnel in ways like those mentioned in the text, page 488.

8. Find out how some of the older members of your family came to choose the occupations in which they are now engaged.

9. Make a list of three or four occupations which you now think might attract you as life work. What preparation is needed for each?

10. Look through to-day's paper to see if you can find any suggestions that some person or group thinks another is not "playing fair" in the game of life. Ask the older members of the family if they think anyone or any group is getting more than is deserved. Perhaps you can get these older members to read the section on *the team spirit and living together well* and to talk it over with you.

11. A certain famous person once said: "I hate X." "I didn't think you knew X," replied a friend. "Of course I don't know him. I couldn't

hate him if I did. One can't hate a person he knows" was the answer. Why is it important, in our society, that one specialist shall come to understand something of the work of other specialists?

12. "The newness of our ways of living together makes it hard to get good teamwork." Why? What can be done about it? Is this book doing anything?

13. Cite cases other than the ones given in the text where persons are engaged in stirring up distrust and suspicion. What do you think of such persons?

14. Why must we find ways of controlling monopoly?

15. Ought we to try to wipe out individual initiative? To wipe out the gain spirit?

16. It is said that the people of New York to-day have poorer schools, poorer streets, and many other forms of living poorer because of the grafting done by Tweed's gang in an earlier generation. Could this be true?

17. Which expression seems to you descriptive of the political grafter: snake, wolf, buzzard, robber, good citizen, Judas Iscariot, traitor?

18. "When one gains by harming society he harms you and me." Why?

19. What is meant by calling custom "unthinking" or "unplanned" social control? Name some forms of "planned" social control.

20. What things in your school show that we are paying attention to the social sciences and therefore to social organization?

21. Why is the person who resists all change in our social organization a dangerous member of our society?

22. Why is the person who wishes changes to be made very quickly a dangerous member of our society?

23. Why is the person who is not content to have changes made in an orderly way a dangerous member of our society?

24. "No vital change would work well in a democracy unless the great mass of the people had studied it, tested it, and made it a part of their thinking." Why?

25. "We ought to stop finding fault with our institutions." "We ought to think of our institutions as being the result of past progress but as being something that can be improved." "We ought to assume that all institutions are out of date." With which of these three quotations do you agree?

26. Answer the questions at the beginning of the chapter, page 479.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter XVI.

1. Improving Our Market Machinery (one example of how we improve the knitting together of our specialists).
2. Vocational Guidance (how one city school system handles this work).
3. Wastes in Industry (some of the defects of our scheme of social organization).

See also Chapters XII, XIII, XIV, and XV.

Problems to think over are given in these reading selections.

PART V

MAN, THE IDEALIST AND ASPIRER

PURPOSES OF PART V

1. To discuss ideals and aspirations as another great factor of human progress.
2. To discuss the ideals needed for our future living together well.

CHAPTER HEADING OF PART V

Chapter XVII. Ideals, the Guides to Living Together Well.

Did you ever hear of Frankenstein's Monster? There is a story of how Frankenstein, a scientist, made a huge man-like thing and put the spark of life in it. It was very powerful; and the gruesome, frightful thing came to use its tremendous powers to kill and wreck. It finally destroyed itself.

This story has a lesson for us. Our civilization, thanks to science, has in it tremendous powers. But how are those powers to be used? Are they to be used to give us better and nobler lives? Or is our civilization with its giant powers, its vast mechanical devices, and its huge institutions some monster that we have brought into existence only to have it kill and wreck, — and finally destroy itself?

The answer rests with you. You will make our civilization either a blessing or a monster.

CHAPTER XVII

IDEALS, THE GUIDES TO LIVING TOGETHER WELL

A. THE IMPORTANCE OF IDEALS AND ASPIRATIONS
B. THE IDEALS AND ASPIRATIONS OF THE INDIVIDUAL
C. THE IDEALS AND ASPIRATIONS OF THE GROUP
D. WHAT DOES THE FUTURE HOLD?

QUESTIONS TO KEEP IN MIND WHILE READING THIS CHAPTER

1. Are ideals and aspirations worth having?
2. As best we can judge, what ideals are most worth emphasizing to-day?
3. Is there challenging work ahead of us?

As we think back over the story of human progress, it becomes clear that we have now studied three great factors or forces upon which that progress depends. We have seen in Part II that our progress depends upon our ability to harness nature, science being the greatest of all harnessers. Our progress also depends (see Part III) upon our ability to be good communicators. It also depends (see Part IV) upon our ability to be good social organizers, — upon our ability to work coöperatively through many social institutions. There is a fourth factor, without which these other three would not enable us to live together well. This fourth factor, ideals and aspirations, is to furnish the subject matter of our study in Part V.

A. THE IMPORTANCE OF IDEALS AND ASPIRATIONS

(Ideals are basic to living together well: artists, research workers, and other standard bearers of ideals and aspirations.)

The importance of ideals as illustrated by the work of Jesus of Nazareth. — Nineteen hundred years ago the greatest

person of all time was carrying on His work. He was absolutely without "influence" or "pull." His race was weak and despised; His family were humble craftsmen,— carpenters; His birthplace was a manger. A poorer start in life cannot easily be pictured. Then, too, when He grew up his work was not the kind that usually brings fame or power. He was not a warrior leading troops to battle; He was not a ruler of a nation. He was a teacher of ideals and aspirations.

But notice how great an influence these ideals and aspirations have had. His followers are so numerous that His teaching constitutes one of the four great religions (see page 321). The millions of Christians acknowledge Him as their Lord and Master. His sayings (as best they can understand them and live up to them) set the one great standard of their hopes and thoughts and acts. Even the peoples who reject him as a god (as do the Jews, Mohammedans, Buddhists, and others) think of Him as a great teacher, as a man who actually thought god-like thoughts, did god-like deeds, and spoke god-like words. He is one of a small number of really great forces that shape human history.

Such has been, and is, the influence of one set of ideals upon human progress. Surely, ideals and aspirations are multipliers of our powers. Or perhaps it is better to think of them as pointing the way to the best use of our other multipliers. "Man is an upward-looking animal," said the ancient Greeks.

One writer's list of the six greatest men in history includes only standard bearers of ideals and aspirations. — The work of Jesus is clearly one of the best illustrations we could find of the tremendous importance of ideals and aspirations. Since, however, many peoples think of Him as a god, let us take another illustration which shows the importance of the ideals of mere men.

Some time since, a well-known English writer was asked for a list of the six greatest characters in history — greatest in the sense that they had had great effect upon human progress. At the head of his list, he placed the penniless teacher of Nazareth. Next he named Buddha, another Jesus-like type of man, who also told the world of the sin and uselessness of selfishness. Then came the Greek scientist, Aristotle, who stood for scientific method (see page 168). "First of all, let's get the facts," he said. Again and again man, the harnesser of nature, has turned to that simple formula of progress. Akin to Aristotle's work was that of the Englishman, Roger Bacon, of the thirteenth century, whose cry "Experiment, experiment!" helped to round out scientific method and to "set men to thinking along new, fresh lines." And there was Lincoln, who was placed in the list because he stood for the best ideals and aspirations of America; for equal opportunity; for quiet faith in a government of the people, for the people, and by the people. Finally there was Asoka, Asiatic monarch of the third century, B.C. (see page 467) who harnessed nature, provided torchbearers, and tried to carry out the ideals of Buddha.

No doubt others would make a somewhat different list. I confess I should wish to make changes in it. But what a list it is! Only two were rulers; the rest were humble scientists and teachers. Even the two rulers were placed in the list, not because they were rulers, but because they were idealists and aspirers; because they served their fellow men. When one thinks how enduring their fame has been, as compared with the fame of conquerors and money grabbers, he begins to understand the saying of one our writers that many persons try to *push* their way into fame and fail; but a few rare persons *forget* themselves into fame. These rare souls are always standard bearers of man's ideals and aspirations.

Who are our standard bearers of ideals and inspirations? — Standard bearers of man's ideals and aspirations! What a wonderful task that is! Who are these standard bearers?

As has just been said they include, among others, our truly great leaders who have had the rare power to forget themselves, and to pick out from our race experiences the simple truths that point the way to progress. In your study of history you will become able to add other names to the list of six just given.

Courtesy of Selfridge and Company

THE CALL TO SERVICE

But these famous persons are merely the standard bearers who stand out a bit ahead of the rest of us. Every one of us who tries to do right, every business man who is square and honest, every faithful preacher, every teacher who teaches unselfishly and well, every doctor who cares most to serve his patients, — *every one of us who tries to do right is a standard bearer of ideals and aspirations.* Furthermore, every one of us is a member of various groups — the family, the church, the club, etc. — that are also standard bearers.

But let us think together, for a few paragraphs, of two sets of standard bearers of aspirations who are not always

thought of as standard bearers. They are artists and those engaged in research.

The artist as a standard bearer of human aspirations. — Too often the word artist is used as meaning only those who draw or paint. In a better and broader sense, however, it includes these and also those who work in music, architecture, sculpture, and literature. Let us use it in this broader sense.

Courtesy of Selfridge and Company

THE MAIN BRANCHES OF ART

Can you tell what branch of art each figure represents?

There can be no doubt that the work of the artist has great influence over us. Take music, for example. The great Chinese teacher Confucius, said, "Desire ye to know whether a land is well governed and its people have good morals? Hear its music." The German statesman, Bismarck, said that song was one of the chief agents in making a united nation of Germany in the last century. The myth of Orpheus being able to charm his way through the terrors of Hades by the use of music shows what the ancients thought of its power.

But we do not need to depend upon the opinions of others for our knowledge of the power of music. We know how the musicians of an army increase its fighting powers; how a passing band thrills us and tempts us to follow; how a song will stop a panic in a burning theater; how the mother's lullaby soothes us when tired or ill; how the music at church seems the best and truest part of our worship; how the

singing at a school game seems our best expression of school loyalty. Music has very great influence over us.

What is true of music is just as true of other forms of art. They all move us profoundly. Harriet Beecher Stowe's book of the 1850's, *Uncle Tom's Cabin*, aroused so much feeling against slavery that Lincoln more than half meant what he said: "This is the little woman whose book caused this great war." Two generations ago a series of cartoons by Nast in the New York magazines and newspapers did much to cause the people of that city to break the rule of a gang of corrupt politicians. The cathedrals of Europe have for centuries greatly moved thousands of worshippers. Every form of art has a great influence upon us.

The artist interprets life. — The reason for this great influence of art is very simple. The true artist forgets himself in his work and makes a sort of summary of man's ideals and aspirations in a painting, a song, a drama, or what not. For example, what Harriet Beecher Stowe did was this. She looked beneath the surface of our living together in the 1850's and gathered into her book a story that expressed the emotions and wishes and aspirations of her fellow men concerning slavery. She became a standard bearer of our aspirations in that matter.

Nast did a similar thing in his New York cartoons on graft. Every real artist does it. He sees greater, simpler truths than others do; he sees them more clearly. He shows us duller persons our inmost dreams, joys, and aspirations; he explains us to ourselves, and he explains others to us. We ought, therefore, to think of a true artist as a standard bearer of our aspirations who takes some method (painting, music, literature, etc.) of communicating to us the great truths he sees in life.

The research worker as a standard bearer of man's aspirations. — There is another worker who deserves to be placed

alongside the artist as a searcher for the great truths of life. He searches and searches. We call him, quite properly, the re-searcher.

Several times in this book we have crossed the trail of the worker in scientific research. In our story of man, the harnesser of nature, we saw him patiently building up the sciences basic to medicine, engineering, and agriculture. We saw him at work in the laboratories of our universities, our business houses, and research institutions. In our account of man, the communicator, we saw him building up the knowledge that will give us better and better means of communication. Then, too, he is at work in the social sciences, slowly gathering facts out of which we hope some day to get better ways of coöperating in organized society. In whatever field he works, he seeks just one thing, truth. In him man's aspiration for truth and knowledge is at its highest.

Ideals are very real and very important. — We have taken this closer look at the artist and the research worker because they are rendering such good service that we should all understand their work and should have a chance to think about such work as a life task. But no matter what we work at, we can all be standard bearers of ideals and aspirations. And there is no more important task in our society. Although we cannot feel or taste or see them, there are no things in life more real than ideals and aspirations — no things more important to our living together well. As we have studied the various multipliers of man's powers, we have always found that mere multiplication is not enough. Greater powers may be used either for evil living or for living together well. A great need of our day is a set of ideals that will cause our great powers to be used for living together well.

Time after time we have seen that we need good ideals to guide us. Let us now add to the list of fourteen statements

given on pages 180, 333, and 481, concerning living together well, two more (numbers 15 and 16) that talk very definitely of the development of ideals and aspirations. We shall need to talk of two kinds: (1) *individual* ideals and aspirations, that guide you and me and every one of us, and (2) *group* ideals and aspirations that guide the actions of our various groups.

15. How well we shall live together depends upon whether we can hold fast to the good *individual* ideals of the past and at the same time build up needed individual ideals for the future.

In particular, we need to emphasize the ideal of service, and we need to carry our ideals over into impersonal situations. We shall see what that means in Section B (pages 520 to 528) of this chapter.

16. How well we shall live together depends upon whether we can hold fast to the good *group* ideals of the past and at the same time build up needed group ideals for the future.

In particular, we need to emphasize the ideal of directing our energies to producing, generation after generation, an ever better MAN in all his aspects — harnesser, communicator, social organizer, and aspirer. We shall see what that means in Section C (pages 528 to 533) of this chapter.

B. The Ideals and Aspirations of the Individual

(How well we shall live together depends upon our ability to develop better individual ideals of service.)

Individual ideals and aspirations develop readily in face-to-face groups. — Perhaps the main influence in forming a person's ideals and aspirations is that of his little face-to-face groups such as the family, the school, the church, the playground group, and the club. I shall not need to argue this point. Our study of torchbearers in Chapter X has quite prepared us to see that it is true.

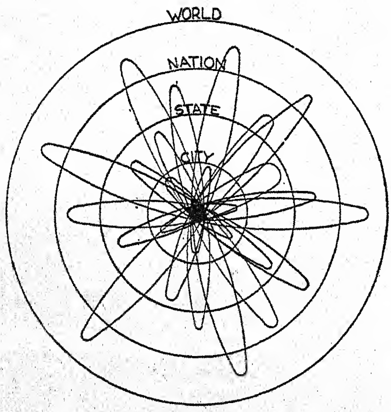
If we go back to early men, when ideals and aspirations were in their early shaping, we can see the point even more clearly. Of course, the family was one of the very earliest groups and it is easy to see how ideals of love and service would grow up between mother and child. But let us pass by all the slow development of thousands of years and take a look at the face-to-face groups of neolithic man.

Take the Iroquois, again, as our example. An Iroquois lad, as he grew up, was a member of such face-to-face groups as these; the family, the gens, the village, the play groups, the hunting-party groups, the war-path groups. In all these he lived in a very intimate and *personal* way with a small number of other Iroquois. The ways that proved "right" became customs and developed into ideals of courage, hatred of enemies, patience in the chase, respect for elders, kindness and sacrifice for members of the group (but not for others), and loyalty. It was not hard for the individual Iroquois to hold fast to such ideals. In the first place, the group kept hammering them into him through the rule of custom. In the second place, his natural sympathetic feelings for those he met so frequently face to face led easily to such ideals.

Our society, however, has many groups that are large and impersonal. — To-day our face-to-face groups continue to be good places for the development of individual ideals of loyalty, patience, squareness, sacrifice, kindness, and service. But, as we have seen so many times in this book, in addition to being members of such face-to-face groups, we have become members of far larger groups — groups of a huge size never dreamed of by neolithic man — groups that do not meet face to face or day to day.

For example, we are members of a huge city or county, of a state, of a nation, even of a world society. We belong to a

trade-union or to an employers' association having members in the United States and Canada, and relationships with similar groups in Europe. We belong to a church whose members are scattered all over the world. We are one of 50,000 stockholders scattered all over the United States if we own stock in one of our large corporations. If we chose, we could easily make a list of fifty such huge groups and these fifty would be only examples of the hundreds that exist. The growth of knowledge, the wonderful developments in communication, and the great increase in our ability to organize to do things are the reasons why we have been able to form such large groups.



Let the dot in the center represent "you." You are a member of many groups—some are local, some are state-wide, some are nation-wide, and some are world-wide. Can you give an illustration of each type?

It must be clear that in these huge groups the members cannot have a personal interest in one another. Their relations are *impersonal*, rather than personal. It is therefore not so easy, in these large groups, to hold fast to individual ideals of loyalty, patience, squareness, sacrifice, kindness and service. Let us look at a few examples[1] of the way we live together to-day so that we may see how true this is.

The impersonal life of a large city is a good example. — Picture to yourself the life of a person in a small village. He knows and calls by name every man, woman, child, and dog he meets. He meets the same persons day after day in the

[1] Adapted from Lesson B-12, *Lessons in Community and National Life.*

store, at social gatherings, at church, and at town elections. He knows all about everybody else; they know all about him. He would not think of doing anything that would harm his friends and neighbors.

Follow this man as he moves from the village to a new home in a city. Perhaps he moves into a flat building in which twenty or thirty other families live. These families are strangers to him and are likely to remain strangers. He does not meet them in church or in the shop where he works or on the street. Everywhere he goes he sees new faces. Strangers jostle him on the cars and in stores; strangers manage the plant from which his water supply comes; strangers govern his city — strangers whom he may come to know by name but generally not by sight; strangers run the electric-light plant which furnishes his flat with light. He entrusts the teaching of his children to strangers. He depends on strangers to take care of him at the hospital if he is sick. He may never even see his milkman.

A Modern Apartment House

As many people live here as would be found in a large village, but most of them remain strangers.

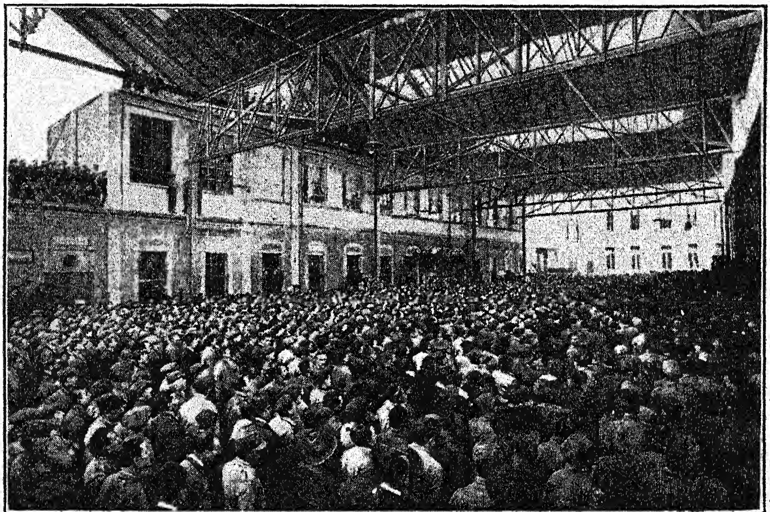
In other words, in our modern cities great masses of people

come together without taking a personal interest in one another. "There is no place so lonesome as the crowds of a great city" has become a common saying. Now, when personal interest is lacking, we often neglect the rights of others. Persons who go from small communities to large cities often "go wrong" in various ways because they are no longer held by personal ties and friendships, and have not yet become clear enough about their duties to that vague thing we call "society" to keep them from doing harmful acts.

This lack of personal interest that exists everywhere in our society affects the way persons act toward one another. In the old days, if a village carpenter knowingly put a piece of poor wood in a child's swing and the swing broke and the child was hurt, the carpenter could hardly help feeling guilty. The result was that the carpenter was careful. But how about this case? A worker in a steel mill is careless and lets a poor lot of metal go through. This metal goes through other factories and is finally made into a defective wheel. Six months later this wheel bursts in a shop two thousand miles away and kills five workers. Will the responsible person have a guilty feeling? Probably he will never even hear of the accident. Even if he does, he has no way of knowing that the wheel was made from the poor metal that he turned out. Or take still another case. In a farmer's house there is a case of scarlet fever. No one could imagine this farmer taking a neighbor's child into the house so that the child might catch the fever. Yet this farmer might be careless in sending his milk to a city, and this milk might carry the fever to fifty strangers without the farmer's ever knowing it.

There is need of extending our ideals to cover our impersonal ways of living. — To sum up what we have been talking about: In the old days the results of a person's acts, whether good or bad, were almost always felt right in his

own little group. He and everybody else knew who was responsible. He had a personal interest in the results of his acts for he saw those results working out among his friends. To-day, our world has been so knitted together that the consequences of one's acts may be felt thousands of miles away, and our ways of doing things are such that there may be no



PART OF THE WORKING FORCE OF ONE FACTORY

Relations between owners and workers must be somewhat impersonal in such a huge group.

way of finding out who is responsible. Even if someone could know he was responsible, he would not feel as badly over evil consequences to strangers two thousand miles away as he would over evil consequences to his friends or his family.

What can be done about it? Clearly we cannot return to the old ways of making goods and living together. We wish to keep the new ways, for they are very effective. But we must find means of avoiding the evils of these new ways.

One way to do this is to get good ideals to guide us in our acts. We must get everyone to understand how far the consequences of his acts may reach. Next, we must get everyone to feel anxious not to harm the members of this impersonal "society," as he is to-day anxious not to harm his friends of his face-to-face groups. This is only another way of saying that we must extend our ideals so they can guide us in the impersonal ways of living together that have developed so fast in the last hundred years.

Good ideals of service are the ones needed. — I hope this does not sound vague. If it does, it can be said in another way. What we need is to become filled with the ideal of service.

We cannot stop to see what it would mean in each of our 7000 and more occupations if we all were filled with the ideal of service, but we can look at a few examples. The table on page 527 shows how differently four sets of persons act when the ideal of service — the professional spirit in our work — is regarded more highly than the promptings of the gain spirit. If we are to live together really well in the future, our individual ideals must come to guide us in some such way as this. Only thus can we work together coöperatively in pulling the load in our society.

Service, the path of true happiness. — It is worth pointing out, too, that only thus can we be truly happy and contented. Hear the story of Faust, in this connection.

The great poet, Goethe, gives us in his *Faust* the results of some sixty years of thinking over what things are really worth while in this life. As the story runs, Faust was permitted to taste, one after another, the pleasures that so many men crave. He tried knowledge, riches, power, beauty — and on down the list. But he did not find any of them really satisfying. In his old age, he set about a task of draining lands and reclaiming them from the sea. He did this to show his com-

mand of nature, but there came to him a sudden realization that he was providing a chance for millions of free people, still to come, to engage in noble labor. This realization that he was rendering service to others brought him, at last, his long sought Great Moment of perfect happiness.

> "Then dared I hail the moment fleeting:
> Ah, still delay — thou art so fair!"

The life of service in which self is forgotten, says Goethe, is the only one that brings true contentment.

	Examples of how one acts when ruled primarily by the gain spirit.	Examples of how one acts when ruled primarily by the professional spirit.
A lawyer	"Anything to win a case." Takes a case only if there are big fees. Helps crooks and grafters harm society if well paid for helping.	Expects to make a good living but only by serving society. As anxious to see justice done as to win a case. Will not help crooks and grafters in their plans.
A physician	Gives advice that will increase his fees. For enough money will provide harmful drugs. Not much interested in preventive medicine, for that reduces the amount of sickness.	Expects to make a good living through clean, honest service. Prevents all the sickness he can. Serves the unfortunates who are not able to pay him as carefully as he does the rich.
A manufacturer	"Anything to make money." Will misrepresent goods. Will evade factory inspection laws. Will adulterate his products. Will be proud of unfair bargains made by shady methods.	Understands that he is a specialist making goods for society. Has pride in good quality. Expects to make money by methods that benefit society.
A merchant	"Anything to make money." Will trick a customer if he thinks he will not get caught. Will be unfair in his competition with other merchants.	Realizes his job is important in society and does it cleanly and well. Will not stoop to unfair competition. Expects to make money by methods that benefit society.

How well we shall live together depends upon whether we can hold fast to the good individual ideals and aspirations of the past and at the same time build up good individual ideals for the future. In particular, we need to emphasize the ideal of service.

C. The Ideals and Aspirations of the Group

(How well we shall live together depends upon our ability to develop group ideals of producing ever better MAN.)

Important as it is to develop sound *individual* ideals of service, that is only half of the story. It is equally important that our *groups* (and especially that large group we call society) should have good ideals — good lights to guide their way.

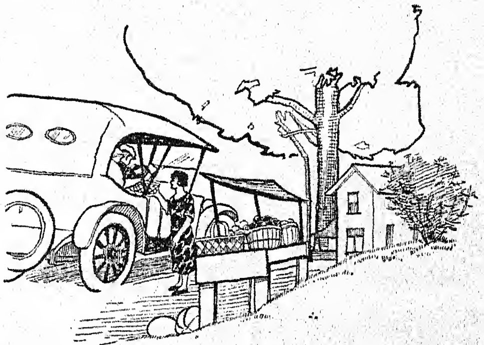
Groups have ideals and aspirations.[1] — *Family ideals.* — Groups have ideals just as truly as individuals have them. Twelve years ago an immigrant family from Rumania settled on a thirty-acre farm in southern Michigan. The ideal of this family is a good education for the children. It has meant hard work and the saving of every penny to carry out this ideal, but the group is succeeding. The brother and the older sister have gone through the local high school and they are now working their way through the State Agricultural College, where the boy is studying engineering and the girl, home economics. The younger sister, who is now in the high school, helps the father and mother with the farm during the winter months. During the summer they all raise fruit and vegetables for sale to near-by towns and to automobile tourists who drive by.

The fact that this family group has made up its mind that the children shall have as full access as possible to the stored-

[1] Cf. Marshall and Lyon, *Our Economic Organization.* (The Macmillan Co.)

up knowledge of the race gives them a standard for judging all their acts. Shall they take a pleasure trip? Not if it costs too much and will cut down the money for schooling. Shall the girl get a new dress? Upon the whole, the old one will do, and the boy's books will be expensive this autumn. If some act will help the family realize its ideal, it is called good policy; if it will not, it is called bad policy. Each member of the family guides his conduct according to the effect it will have on the group ideal.

Communities have ideals.—Villages, cities, and other communities also try to work out ideals. The communistic community described on page 378 has the ideal of living according to their understanding of the teachings of Jesus, and they have held to that ideal through several centuries. It has meant simple living; at times it has meant persecution by others. But they hold to their ideal. It is a standard by which they judge their acts.



Helping to Carry Out the Family Ideal

A village in Illinois had, for several years, the goal of getting some railroad tracks elevated. One city kept in mind for years a plan of a "city beautiful" with parks, boulevards, statuary, and fine architecture. A certain township developed the ideal of sending all students who wished to go to a neighboring high school. Every community has had, at one time or another, fairly definite ideals and aspirations that have guided the conduct of its members.

Groups within communities have ideals. — As a matter of fact, every group is certain to have ideals and aspirations of some sort. A trade-union group will have very definite ideals in mind; some employers' associations will cling to quite different ideals. A chamber of commerce of a city will have one set of aspirations; they may be quite different, in part, from those of the American Farm Bureau. Various engineering societies, as well as some associations of doctors and lawyers have even put their ideals in written form and think of them as rules of conduct or *codes of ethics* for their members. There are literally thousands of groups in our society, and all of them have more or less definite ideals or standards. As we have seen, the ideals of different groups are sometimes in conflict. That is not surprising in such a complex society as ours. The arguments and discussions of such groups are one way by which our public opinion on questions of the day is formed.

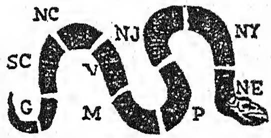
> THE FOUNDATION of business is confidence, which springs from integrity, fair dealing, efficient service, and mutual benefit.
>
> EQUITABLE CONSIDERATION is due in business alike to capital, management, employees, and the public.
>
> OBLIGATIONS to itself and society prompt business unceasingly to strive toward continuity of operation, bettering conditions of employment, and increasing the efficiency and opportunities of individual employees.
>
> CONTRACTS and undertakings, written or oral, are to be performed in letter and in spirit. Changed conditions do not justify their cancellation without mutual consent.
>
> WASTE in any form,—of capital, labor, services, materials, or natural resources,—is intolerable, and constant effort will be made toward its elimination.
>
> UNFAIR COMPETITION, embracing all acts characterized by bad faith, deception, fraud, or oppression, including commercial bribery, is wasteful, despicable, and a public wrong. Business will rely for its success on the excellence of its own service.

A CODE OF BUSINESS ETHICS

This is part of a report made by a committee of the Chamber of Commerce of the United States.

And there are national aspirations. — Nations, too, have ideals. In time of war or other great crisis, national ideals are likely to become quite definite and plain. At the time of our Revolution, for example, the colonists thought they

were not properly treated by the British government. They sought independence, and Patrick Henry's famous utterance, "Give me liberty or give me death," is a good expression of our ideal at that time. In the recent world war the statement of President Wilson, "The world must be made safe for democracy" set forth our national aspiration. The reason why war-time ideals can usually be made quite clear and plain is this: the war is usually about some fairly definite matter, and it is easy to direct the whole nation's attention to the task that is to be done.



UNITE OR DIE
This novel picture was printed in Franklin's paper to urge the ideal of union upon the colonists.

It is much harder to state the ideals of a peace-time society. So many things are being done by so many groups in our rapidly changing society that it is quite natural we should hear many different versions of America's ideals. Everyone has heard the following: "The square deal for everyone," "Fair play," "Equal rights for all and special privileges for none," "Justice," "Liberty," "Democracy," "Good faith," "Life, liberty, and the pursuit of happiness," to mention only a few of the more prominent. One trouble with many such statements is that we do not all agree on their meaning. For example, what seems to some laboring men to be a square deal and justice may appear to some employers as anything but square or just.

Our group ideal is to produce ever better MAN. — But, after all, these various ways of stating the aspirations of our society are not as different as they sound. In the main, they are just so many different paths that may be taken to arrive at one and the same place. It is something like climbing a mountain. If one wishes to see waterfalls, the best route is path number 1. If his taste runs to giant oaks, path num-

ber 2 is his route. If he likes cliff climbing, there is nothing better than path 3. But all paths lead to the top of the mountain eventually.

What is this one place to which all our group ideals lead? What is the "mountain top" of our aspirations? It is the producing of ever better MAN in all his aspects — harnesser, communicator, social organizer, and aspirer. "The goal of all our activity is man, ever better man," says one writer. "Just as every person should serve the group, so also should the group try to make the living together of its members better and better," says another.

Now we cannot afford to be vague about the meaning of these fine phrases. If we are to follow their teachings we need to know exactly what those teachings are. Let us take the general statement: "Our group aspiration is that of producing ever better MAN in all his aspects — harnesser, communicator, social organizer, and aspirer." Now let us run down through the Table of Contents of this book. Evidently the statement (see Part II) covers the aspirations of those who desire a further harnessing of nature: who advocate the wise use of our natural resources; who see the need of more and better capital goods; who deplore the waste of our human resources; who urge the fuller development of all forms of scientific knowledge. All these aspirations are but parts of the larger aspiration, "the goal of all our activity is MAN."

So also, the statement covers (see Part III) the aspirations of those who see the importance of ever-better communication. These persons want better language devices, flourishing trade, a good system of money, prosperous systems of communication, good schools, good churches, and a free and independent press because these multiply men's powers. They help in producing ever-better MAN. They make everyone's living richer and nobler.

Again, the statement covers (see Part IV) the aspirations of those who desire better social organization and social institutions. Everyone desires the best use of specialization; of the market; of competition; of private property; of the gain spirit; of individual initiative; of democracy; of liberty; of justice; of law; of public opinion; of government. True, there is difference of opinion concerning what use is the best use. But that is largely difference of opinion concerning what path to take. There is no doubt in anyone's mind that we wish to reach the top of the mountain. We all wish to use these devices as the means of producing ever-better MAN.

Such an ideal can be an effective guide to group action. — As we have said so many times, our ways of living together have been changing so rapidly in the last one hundred and fifty years that we are in a good deal of confusion. We are like a sailing ship blown about by sudden and shifting winds; battered by ever changing seas; pulled hither and thither by ocean currents. (These winds, seas, currents are our violent discussions of property rights, competition, justice, socialism, etc.). But fortunately we are like such a ship in another particular. We have a compass on board. We can, if we will, guide our course steadily in the direction of producing ever better MAN. If we do this, the batterings and flounderings and driftings will be but incidents of our voyage, for we shall come to port.

How well we shall live together depends upon whether we can hold fast to the good group ideals of the past, and at the same time build up needed group ideals for the future. In particular, we need to emphasize the ideal of directing our energies to producing, generation after generation, an ever better MAN in all his aspects — harnesser, communicator, social organizer, and aspirer.

D. What Does the Future Hold?

(Our unsolved problems — a challenging opportunity for each and every one of us.)

Every careful business man who hopes to make a success of his business does two things. From time to time he makes a list, or inventory, of the goods he has on hand so that he can know exactly what resources he has; and he makes plans for the future. Of course, he can never feel entirely sure how his plans for the future will work out. The future is unknown and uncertain.

As we come to the close of our story of human progress, we are in much the position of such a business man. We have made a fairly careful inventory of man's resources. We have, on occasion, tried to look into the future. What does the future hold?[1]

The older generation once thought it saw clear sailing ahead — but it is now uneasy. — I wish I could sit down with you and talk of that future. Since I cannot, I shall try to write of it in the same spirit in which I talk to my own children who are in the room with me as I write. Of course, I am not of your generation. I am of that older generation that has seen the most wonderful multiplication of man's powers and activities the world has ever known. And I have studied and tried to understand such matters. In view of these facts, you might naturally suppose that I could make positive predictions about man's future progress. But I cannot.

The truth of the matter is that we persons of the older generation are puzzled by what we so dimly see in the future. For a long time we thought everything was going wonder-

[1] The presentation of this topic has been influenced by Raymond B. Fosdick, *Our Machine Civilization*.

fully well in our society. We were harnessing nature at top speed; we were living better than any other people had ever lived; our sciences were growing like magic; we had developed wonderful individual initiative; we, in America, felt that our form of government was a model for liberty-loving people. In brief, we felt that, although man had had a long, slow, bitter climb for thousands of years, he had reached a place where an easier and more abundant future opened out before him, as a fertile countryside opens out before some one who climbs to the crest of a hill.

We are not now so satisfied with ourselves. We are uneasy. We see that evils like poverty, unemployment, bad government, crime, selfishness, graft, unfair competition, the conflicts between worker and employer, the wrong use of the gain spirit, and broken family life (and these are the merest beginnings of the list) remain in our midst, and sometimes even get worse. Perhaps the outbreak of the world war in 1914 and the terrible sufferings and disasters that followed were our greatest shock, for we saw that our social organization was a good deal more unsatisfactory than some of us had supposed.

We are passing our problems on to you with no solutions ready. — In other words, practically everyone of my generation would admit to you that we have not succeeded in solving our social problems. It may be that we are passing most of them on to you in quite as bad shape as we found them.

And practically everyone of my generation would admit to you that we do not know the answers to these problems — certainly not in any detail. We are ashamed of our ignorance. It does seem that we should have done better. Perhaps our minds have been too much in the grip of custom for us to be able to think clearly. Anyhow, there is no use pretending that we have found answers when we have not.

We have thought that certain solutions were promising. — We can, of course, tell you of some of the solutions we have regarded as most promising. That may help a bit.

1. *The eugenics program.* — Many of us feel that it is highly important to do all reasonable things to improve the human stock. This is called the eugenics program. The hope of this program is to build up a stronger and abler race — one that can better bear the burdens of our complex civilization.

Such a program deserves to be studied. But, of course, it is not all that is needed. And even without it we ought to do far better than we are doing. You may remember that some persons think we are not using more than three per cent of our *present* human resources wisely (see page 202).

2. *The social reform program.* — Many of us think a good deal of change is necessary in our social organization. But when it comes to saying just what these changes shall be, we are like the persons who were building the tower of Babel in the Bible story. A confusion of tongues is upon us. We cry "lo, here!" "lo, there!" and get relatively little done.

As I see it, the truth is that this older generation does not know enough about social institutions and social organization to hand you a nice little package of remedies. Our social sciences are just developing. We are just beginning to understand how to live together well. That being true, we should proceed thoughtfully and carefully in making changes in our social organization. There is no possibility that the older generation can finish such a task. It will have to be handed on to you. For that matter there is no reason to suppose that the task ever will be finished as long as man continues to make progress.

3. *The educational program.* — Practically all of us believe that education is to be one of the important means of

solution. "Education" includes scientific research and then broadcasting knowledge through schools, churches, the press, business houses, clubs, classes and writings for adults, etc. This education is needed along all lines, but it is perhaps most needed in the field of the social sciences. But, of course, education is a slow process. It is too slow to enable the older generation to solve all the problems confronting us. Most of them will be handed on to you. Our best thought is that you will do well to work mightily at education. If you do, probably your generation will not need to make quite as shamefaced confessions as I am making to you.

4. *The program of emphasis upon ideals.* — Practically all of us believe that one of our great difficulties is a lack of clear ideals. We are so confused by the rapid changes in our society that we do not have ideals clearly in mind. How shall we get them? Some say, by turning more definitely to religion. Others say, by using education. Others say, by using these and any other devices we can lay our hands on, for it is highly important that we have something to steer by.

This development of ideals is also a slow process. Someone has well said, "The great loyalties of a people are a slow growth, like the oaks of the forest." That being true, we would do well to cling to the good ideals of the past while new ones are shaping up. We cannot go wrong by emphasizing for individuals the ideal of service, and for our groups the ideal of ever-better man (see pages 520 to 533). But even for these aspirations, details need to be worked out. My generation has a few years more of work in it, but it will not do more than get started at the task. The task will be handed on to you.

No generation ever had a more glorious opportunity than yours. — You can readily see that we are passing on to you very heavy burdens and responsibilities. They are nothing

less than the safeguarding of our civilization. Will you rise to the task? If you do not, quite likely there is terrible suffering ahead of the world. If you do, the chances are that all future history will look back at your generation as one of the most wonderful periods in the entire story of human progress.

You probably have the greatest opportunity that any generation has ever known. Think back over our sketch of human progress. The worst of the grinding physical toil of man's climb is behind us. Nature has been harnessed and can be harnessed far more effectively. With just a little sense used, we can live together well, as far as that aspect of our progress is concerned.

So also, man has become such an able communicator that he can work coöperatively in great societies, and even as a world group. Of course, great improvement will always be possible in this (as in any other) realm, but the hard part of man's climb as a communicator is behind us.

This means that you can concentrate your attention and work mainly upon the other two aspects of man's progress: man as a social organizer and man as an idealist and aspirer. In these two aspects, there is still hard climbing ahead. But look at your equipment for this climbing! In the first place, you can be more free from worry about command over nature than could any earlier generation. In the second place, earlier generations have shown you how to make scientific studies and how to build up exact knowledge. That is like putting a saw, a square, a hammer, and nails into a carpenter's hands. With such good tools he has a chance to do good work. In the third place, the character of the problem has been seen,— at least in its outlines. That is half of the battle.

In other words, we earlier generations have done the fumbling around as social organizers and aspirers. You have the chance to build fairly rapidly. You can build upon our work

and you can be guided by our mistakes. Bad as some of our mistakes have been, you will not need to tear down much of our work. You do not need to go through the agony of revolution.

And the future is safe in your keeping, if you think straight and fight hard. — Surely this means that you ought to be able to rise to your responsibilities, serious as they undoubtedly are. My own belief is strong that you will do so. I have entire confidence in the future of man's progress as guided by you. I envy you the joy of your battle and achievement, for I know the furious battle will end in a glorious victory, — *if you think straight and fight hard.*

Problems

1. Define or explain:

Ideals	Individual ideals
Artist	Group ideals
Professional spirit	Impersonal relations
Face-to-face groups	Codes of ethics

2. "The really great man is one who forgets himself into fame." What does that mean?

3. Make as long a list as you can of persons (*e.g.* preacher, teacher, etc.) who are primarily standard bearers of ideals and aspirations.

4. "Every one of us who tries to do right is a standard bearer of ideals and aspirations." Show that this is true.

5. Why is the work of the true artist very much worth while? Why is the work of the research worker worth while?

6. Someone has said that the Lord's Prayer is the work of an artist: that every sentence and idea in it was already in use in religious writings; that Jesus did an artist's work in picking out the nuggets of gold and making them over into a statement highly expressive of man's aspirations. Is that the kind of thing an artist does?

7. How do you account for the fact that a good collection of ancient Egyptian art tells a great deal about the living of that people?

8. "A great need of our day is artists who can tell us to what we are really aspiring. Every puzzled, bewildered people has great need of artists." What does this mean? Is it true?

9. What reasons can you give for having work in art (in the broad sense of the word) in the school curriculum? Is the expenditure of public money for works of art and for instruction in art justifiable?

10. Is a life career in art one that might be attractive? Why is it a good "place" in our society? How is a true artist helping to pull the load in our society? Answer the same questions in the case of the research worker.

11. "The discussions of our face-to-face groups are often concerned with the 'right thing to do' or 'the fair thing' and are therefore great developers of ideals." Watch the discussions of some of your face-to-face groups to see if this is true.

12. Why is it easier to have good ideals in face-to-face groups than in larger groups?

13. Why is it harder to be governed by our ideals to-day than it was one hundred years ago? Is part of the difficulty due to the fact that it is harder to know what is the right thing to do?

14. The Associated Advertising Clubs of the World fight a stern battle against falsehoods in advertisements. Show that they are helping to build up ethics and ideals in our impersonal world.

15. Several organizations or associations of engineers, lawyers, doctors, etc., have printed little "codes of professional ethics" which are expected to govern their members. Show that they are helping to build up ethics and ideals in our impersonal world.

16. A gang of rowdies broke a street lamp. One of them said that they had had fun and that nobody had been harmed. Show that he was mistaken; that their actions caused a burden to society.

17. It is said that it is easy for disputes between employer and employees to be more bitter to-day than was the case one hundred years ago. Give reasons why this may well be true.

18. Are all of these persons wrongdoers?

- a. A person who puts poor cork in life-preservers and sells them.
- b. A person who picks your pocket.
- c. A person who sells short measure.
- d. The politician who grafts school money by arranging for a company in which he owns stock to repair buildings at a high figure.
- e. The workman who puts poor material into the brake of an automobile he is repairing.

f. The owner of an unsanitary tenement house.
g. The newspaper editor who prints cheap personal items.
h. The manager of a corporation.

19. Look at the chart on page 527. Make out a similar chart for the policeman, the preacher, the grocer, the real estate man, the farmer, and the mayor.

20. Talk with your family to see what are the ideals of that group.

21. Make a list of ideals that you think should govern you. Can you tell where any of them come from?

22. Make a list of groups that have members in you community. Here is a start: some trade-union, boy scouts. Continue the list. Can you name an ideal of each group in your list? See if all of these ideals fit into the large ideal of "ever-better man."

23. Look on page 444 at the samples of groups that are trying to form public opinion. Clearly each group has ideals. As best you can judge, do these ideals all fit into the ideal of "ever-better man"?

24. Ask some members of the older generation how they feel about the future of our civilization. Get them to read the section on "what does the future hold" before they answer.

25. Look in to-day's paper. Find some things that would not have happened if everyone were filled with the ideal of service.

26. Show that there will be a great opportunity for leadership in your generation. What qualities will a leader in your generation need? Knowledge? Idealism? Anything else?

27. Answer the questions at the beginning of the chapter, page 513.

Interesting Reading

Marshall: *Readings in the Story of Human Progress*, Chapter XVII.

1. The Development of Ideals and Aspirations (what we owe to Greek, Roman, Jewish, and Teutonic cultures: later forces developing ideals).
2. Michael Faraday (an example of devotion to scientific truth).
3. Thomas Nast (an artist who was a standard bearer of ideals and aspirations).
4. Howard Taylor Ricketts (an example of devotion to the ideal of service).

Problems to think over are given in these reading selections.

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